



KASC INFORMATION SERVICES



Sixth Annual Report

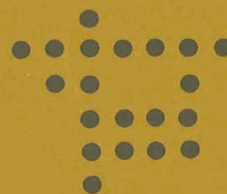
THE SPACE AND TECHNOLOGY TRANSFER PROGRAM

at the

University of Pittsburgh

April 1970

K A S



KNOWLEDGE AVAILABILITY SYSTEMS CENTER
UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213

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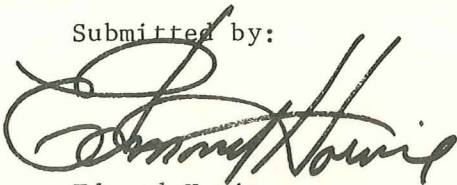
University of Pittsburgh
Knowledge Availability Systems Center

Submitted to:

The National Aeronautics and Space Administration

April 1970

Submitted by:



Edmond Howie
Assistant Director

Approved by:



Allen Kent
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I. INTRODUCTION

This report is submitted in fulfillment of the requirements of the National Aeronautics and Space Administration Contract No. NSR 39-011-089¹⁰⁶ and describes the work performed under the contract for the period March 1, 1969, through February 28, 1970.

The above contract calls for the conduct of a space and technology transfer program at the University of Pittsburgh through the facilities of a regional dissemination center. This report describes the activities of the center in seven sections which are intended to provide the following information:

- Section I - Introduction to the organization of this report.
- Section II - General description of the mission and organization of the Knowledge Availability Systems Center (KASC) of the University of Pittsburgh.
- Section III - The mission and organization of the Regional Dissemination Center (RDC) of the KASC.
- Section IV - The scope of the marketing activities for the services of the RDC.
- Section V - The scope of the Technical Analysis and Technical Operations activities for the RDC.
- Section IV - Evaluation of the RDC services by its clientele and the impact of these services for effecting the utilization of new technologies.
- Section VII - Future plans for the RDC.

In addition to these seven sections, there are two appendices. Appendix A contains sample marketing materials and Appendix B contains a listing of technology transfer cases.

II. THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

The organization charged with the responsibility for developing a University-wide program in the Information Sciences at the University of Pittsburgh is the Knowledge Availability Systems Center (KASC). The Center was established in 1963 with a charter to develop a program of teaching, operations and research in this field.

The current administrative organization of the KAS Center is shown in the chart in Figure 2-1. The activities relating to regional dissemination functions (NASA RDC) are shown in the right side of the chart (under E. Howie, Assistant Director). The research and report coordination functions are shown in the center part of the chart (under E. D. Dym, Assistant Director). The direct research functions are shown in the left (lower) side of the chart (under A. Kent, Director).

Teaching Program in the Information Sciences

Formal curricula at the masters and doctoral levels, with majors and minors in the information sciences, are available from the KAS Center to a number of schools and departments of the University, including:

- Graduate School of Library and Information Sciences
- Department of Industrial Engineering, Systems Management Engineering, and Operations Research
- Department of Computer Science
- Department of Educational Communications
- Department of Special Education and Rehabilitation
- Department of Educational Research

In addition, students from psychology, philosophy, public and international affairs, and business, among others, have enrolled in selected courses in these curricula.

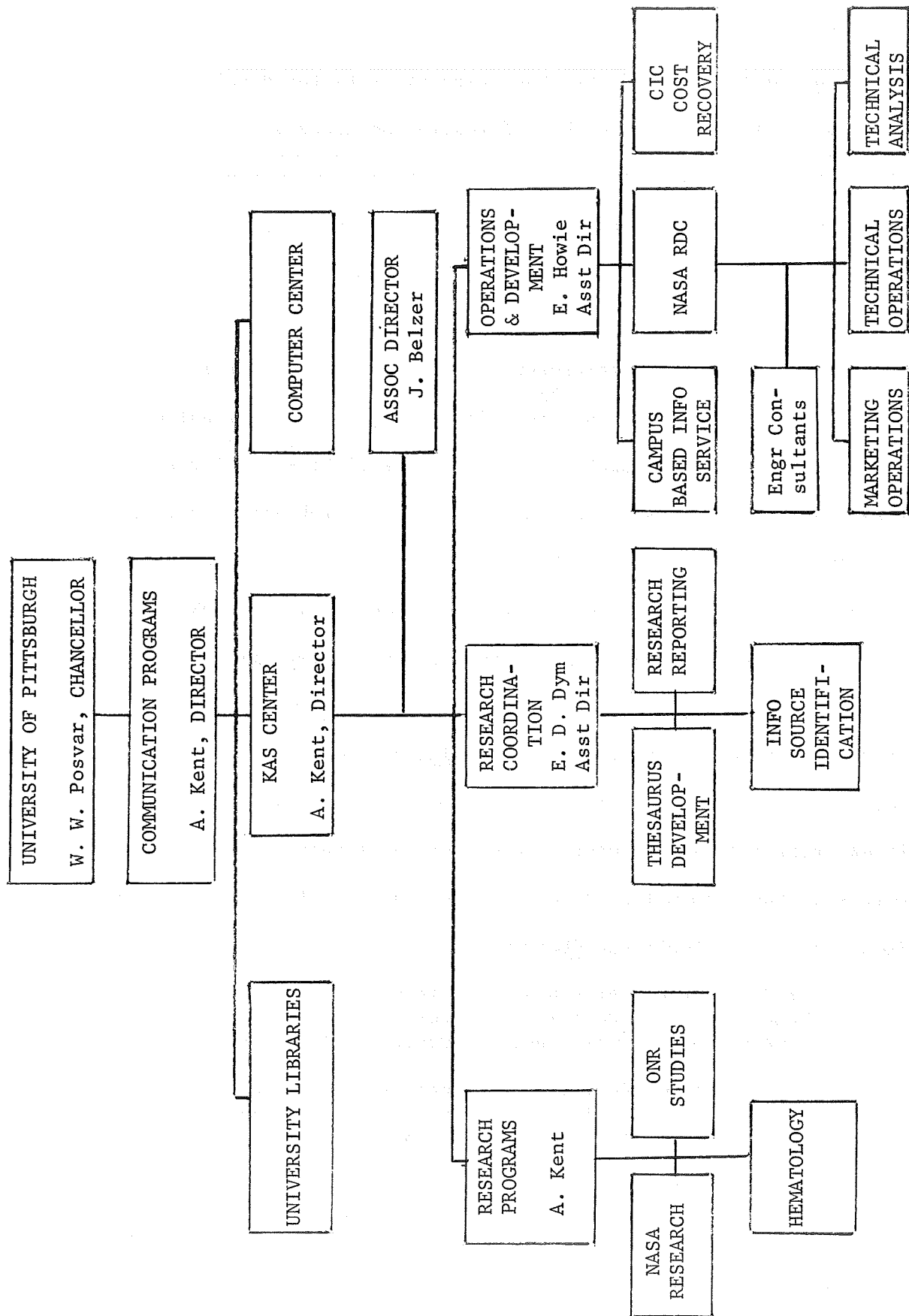


Figure 2-1. KASC Organization - Administrative

Operations Program

The operations program has developed to the point where several computer-based files are being searched for the benefit of faculty, students and industry. The operational projects include:

- o NASA Regional Dissemination Center
- o Chemical Information Center
- o Campus Based Information System

Research Program

The research program has involved the development of some 20 projects in basic areas of concern, including relevance predictability, interactive information retrieval systems, game theory in systems design and operation, learning-relevance relationships, thesaurus development and testing, comparative indexing, and toxicology information source identification.

Impact of KAS Center Activities

The activities of the Center, stimulated by the NASA support of the Regional Dissemination Center, has led to the rededication of the part of the administration of the University of Pittsburgh to pursue aggressively the operational, research and teaching aspects of the program.

The developments have occurred since the establishment of the KAS

Center almost seven years ago, and the term 'KAS' has been diffused
into the thinking of most elements of the University.

III. THE REGIONAL DISSEMINATION CENTER

The KASC Regional Dissemination Center (RDC) efforts to successfully exploit the NASA and other data files are concentrated in four major areas: Marketing, Technical Operations, Technical Analysis and Engineering Consultation (see Figure 2-1). In general, the mission of the Marketing group is to publicize the Program within the proximate geographic area of the University of Pittsburgh. It is their function to convince all segments of the economy within the area that the NASA file and those made available through NASA are a scientific and technological reservoir of information having a real potential value to them, and that they could and should exploit them to their advantage.

The Technical Operations group has the responsibility for processing all profiles through the system and for timely service from receipt of the customer's query to submission of search output.

The Engineering Consultant group provides a technical expertise which is utilized to the client's benefit by phrasing his profiles, maintaining periodic contact with him and general interpretation of the technical content of identified citations.

The Technical Analysis Section also provides technical expertise which is applied just as in the Engineering Consultant group. In addition, this group provides an Information Science expertise which is utilized in the preparation of search strategies and for the successful exploitation of both mechanically and manually searched files.

Personnel

Currently, there are 37 personnel assigned to the NASA RDC at KASC. This is 6 more than last year and reflects the increase in marketing efforts and the establishment of a campus based information service. The total excludes the Director of KASC, his administrative assistant and his secretary, who together maintain administrative and overall budgetary control over the NASA T/U Program.

Nineteen of the personnel assigned to the RDC activity are full-time professional and nonprofessional staff members of KASC. In addition, there are five part-time professional and four part-time clerical personnel on the payroll. The remaining nine personnel are full-time faculty and staff members of the School of Engineering.

Table 3-1 illustrates by category the KASC RDC manpower level for the last two years.

Engineering Consultants

This group is comprised of senior members of the faculty and staff of the School of Engineering of the University. Together, these personnel form a spectrum of scientific and technological competence which is applied to the client's needs.

These consultants are assigned to the client's profile, not to the company as an entity. Also, the assignment is made on the basis of

Table 3-1. KASC Manpower Levels

CATEGORY	1968/1969	1969/1970
Engineering Consultants	9	9
Full-Time Professionals	5	7
Full-Time Clericals	10	12
Part-Time Professionals	4	5
Part-Time Clericals	3	4
TOTALS	31	37

the technical disciplines associated with the client's interest areas. Thus, depending on the number of interest profiles and the disciplines involved, a single client may have one or more consultants assigned to service him.

The group currently comprises nine personnel servicing KASC on a functional basis and is under the direction of the Associate Dean of the School of Engineering, Walter E. Turkes.

Dean Turkes is responsible for establishing technical contact with new participants in the Program, maintaining technical liaison throughout the service period, and implementing periodic contact at the management level of the client organization. On the basis of these technical and managerial contacts, Dean Turkes advises the KASC Assistant Director responsible for the RDC operations as to any action needed to improve KASC/client relationships.

The remaining members of the consulting group are:

Coull, James, Ph.D.	Professor, Chemical and Petroleum Engineering
Geiger, Gene E., Ph.D.	Associate Professor, Mechanical Engineering
Gratton, Mercer	Assistant Chairman, Metallurgical and Materials Engineering
Hamilton, Howard B., Ph.D.	Chairman, Electrical Engineering
Maggio, Ralph, Ph.D.	Associate Professor, Industrial Engineering
Miller, James P., Ph.D.	Associate Professor, Civil Engineering
Sze, Tsung Wei, Ph.D.	Professor, Electrical Engineering
Trout, Harry E., Jr.	Assistant Professor, Metallurgical and Materials Engineering

Each of the above personnel has academic responsibilities which comprises the major portion of his work load. However, that part of his time which is devoted to KASC clients is recognized as implementation of a formal commitment by the University of Pittsburgh to the RDC activity.

These subject specialists meet with client representatives to phrase interest profiles and, depending on the type of service desired, they review computer output to screen out system 'noise,' maintain periodic

contact with their counterparts at the client's establishment, and report to the RDC administrator the results of each of their contacts.

Technical Analysis Section

The function of the analysis group is to successfully exploit the technical content of the RDC files to the benefit of the participating clients. In implementing this function, the group relies heavily on the engineering personnel who provide in-depth subject expertise and who act as consultants in a limited capacity related to the technical contents of identified citations and the application of this technical information to the client's needs.

The analysis group currently comprises a complement of eight personnel, seven of which are professional. The nonprofessional is the secretary. The professional cadre includes two full-time and five part-time personnel.

These personnel are all subject specialists who are technically competent in their own right. Each has an undergraduate degree in a physical science or technical discipline. In addition, all but one has at least one graduate degree in either a physical science or Library and Information Science.

Four major factors differentiate the analysis section from the engineering consulting group:

1. The consultants have greater in-depth expertise in their subject areas.
2. The analysts have greater in-depth expertise in reference sources and searching techniques.
3. The analysts have greater in-depth expertise in formulating computer search strategies.
4. The analysts are part of the line organization of KASC-- the consultant group is only a functional unit of the Center.

The talents of both groups are so complementary that when profiles are assigned to a subject specialist, the discussions between Dean Turkes and the manager of the Technical Analysis Section are based on the two groups being one subject specialist pool of talent. However, if an "engineer" is assigned to a profile, the computer search strategy is prepared in consultation with an information specialist.

Method of Operation

Participation in the KASC RDC activity is initiated in different ways, e.g., a formal agreement or a purchase order. Regardless of the mechanism, when a formal (and sometimes informal) relationship is established, the initial step is to arrange for a profile phrasing effort. And, because an interest can be stated in a variety of ways, a standard form was designed to be filled out by the customer himself. A written expression of his own interest aids the client in defining more precisely the interest profile and thus facilitates the preparation of a more effective computer search strategy.

The query form is filled out by the customer and submitted to the marketing section together with a purchase order (or other authorization). Upon receipt of the authorization, an "action request" form is completed in triplicate and submitted to Dean Turkes, to Technical Analysis, and to Technical Operations informing them of the new participant's interest in exploiting the NASA RDC files. A copy of the query form(s) is submitted with the initiation memorandum to provide a basis for assignment of the subject specialist.

The subject specialist is assigned cooperatively by Dean Turkes and the manager of the Technical Analysis Section and Technical Operations initiates the necessary records for service to the Client. After this, a meeting is arranged with the technical representative(s) of the client. The purpose of this meeting is to phrase profiles, i.e., to document as complete as possible the background of the client's needs and interests. This meeting may be a simple telephone conversation if that is all that is needed. Once the profile is phrased, an information analyst will make a final selection of terms and construct a Boolean-type computer search strategy. A mechanized search will be performed, and the result will be a computer listing either of the identification numbers or bibliographic citations of documents in the file whose index terms match those in the search strategy.

Up to this point in the procedure, all profiles are handled in much the same way. However, from this point on, service will differ, depending on the client's needs and wants. If a client has requested Type I ser-

vice, he will receive only a computer listing of document identification numbers, unless he has access to the published abstract journals which correspond to the file searched, this computer listing is of little value.

A customer subscribing to a Type II service will receive a complete abstract or bibliographic citation of each item identified by the computer search. In this instance, the customer will be saved the time and effort necessary to obtain the abstract journal for the purpose of making a relevancy decision.

In both Type I and Type II service, the client will receive total computer output--including all 'noise.' Thus, to use a classic example, a client interested in 'venetian blinds' will also receive literature on 'blind Venetians.' In both Type I and Type II service, the assigned subject specialist participated only to the extent necessary to phrase profiles and prepare the search output. Computer output is submitted to the client without review by a subject specialist.

In Type III service, the client also receives a complete abstract or bibliographic citation of all items identified by the computer; however, those citations deemed relevant to his interest profile by the subject specialist assigned to the profile have been clearly marked for the client's rapid recognition. When the computer search is performed, the second output is evaluated by the assigned subject specialist for relevancy to the client's profile. The relevant items (venetian blind) are

marked and separated from the non-relevant items (blind Venetians) and the results are submitted to the customer.

A fourth type of service, Type IV, is equivalent to Type III except that the profile is one appealing to a broad group of individuals and is commonly referred to as a Standard Interest Profile. Before submitting the search results to the group of subscribers, non-relevant items have been discarded.

In addition to profile phrasing and output review, the subject specialist is expected to contact all clients whose profiles have been assigned to him on not less than on a quarterly basis. The purpose of the contact is to determine client satisfaction (or dissatisfaction), to assist the client in the utilization of technologies, and to document the specialist's recommendations or findings. Reminders of the need for contacts are provided to the specialists by Technical Operations for each profile through the addition of green signal dots to the computer printout. Such signals have become known in the KASC as "green triggers."

The Technical Data Files

The KASC RDC has available to it, either through possession or through other NASA regional dissemination centers, five technical data files.

- The unclassified document collection of NASA
- The unclassified document collection of the Defense Documentation Center

- Chemical Abstracts as represented by the two computer tapes CONDENSATES and CHEMICAL TITLES
- The Engineering Index computer tape COMPENDEX
- The computer program collection of NASA available through COSMIC

One or more of these files may contain the information or technology that a KASC client requires for the solution of a problem, the identification of a source, a state-of-the-art summary, a new market, a new product, etc. Whatever his need may be, utilizing these files and the expertise of the KASC, the Center is organized to assist him.

Exploitation of each file is not performed identically. The NASA, DDC, and COMPENDEX are issued or searched on a monthly basis, whereas CONDENSATES is issued weekly and CHEMICAL TITLES is produced biweekly. The computer programs of COSMIC, the smallest of the files, are announced in the NASA publication Computer Program Abstracts which is produced irregularly as sufficient programs are added to the collection to warrant its publication. As may be suspected, it is searched manually while the other files may be mechanically searched.

Each magnetic tape issued for NASA, DDC, COMPENDEX, and CHEMICAL TITLES covers the same subject categories as the previously issued tape, but in only every other tape of CONDENSATES are the subject categories repeated.

A mechanical search of the files results in two kinds of output. The NASA, DDC, and COMPENDEX computer printout consists of a listing of the accession numbers assigned to the documents which constitute the file.

Following a search of these files, the abstract of the document must be reproduced, either from the announcement bulletin of the file or a specially produced card file of abstracts. The computer printout of the CONDENSATES and CHEMICAL TITLES tapes results in the full bibliographic citation for each document. For the first three tapes, a client receives abstracts of documents cited by the search reproduced three to a standard $8\frac{1}{2}$ x 11 inches page. For the last two tapes, the full bibliographic citations are printed individually on cards approximately $7\frac{1}{4}$ x $3\frac{1}{4}$ inches for CONDENSATES and in list format on standard 11 x 15 inches computer paper for CHEMICAL TITLES.

This variation in search output prevents the offering for each file of the three types of service discussed earlier. Type I service, the output for which consisted only in the listing of accession numbers of items cited by the computer search, is obviously bypassed by the CONDENSATES and CHEMICAL TITLES files because their output consists of the full bibliographic citation for each item. Type II and Type III service are available for all files but the full bibliographic citation of CONDENSATES and CHEMICAL TITLES must be equated with the abstract provided for the other files.

Currently, both retrospective (Retro) and current awareness (C/A) searches are not equally available for all files. Both Retro and monthly C/A searches are available for the NASA document collection which began in 1962. The same is true for the DDC file; however, the Retro search cannot cover materials earlier than 1964. Monthly C/A searches are

available for COMPENDEX but because it was issued beginning in 1970 Retro searches can cover only a limited amount of material. COMPENDEX was preceded by a tape entitled CITE, constituting a selected portion of COMPENDEX, which was issued during 1969 and is currently being used to increase the scope of a Retro search for COMPENDEX. Weekly C/A searches of CONDENSATES and biweekly C/A searches of CHEMICAL TITLES are available; however, Retro search service for these two tapes is under development and is not expected to be available until mid-1970. Any search of the COSMIC computer program collection would be performed manually through the subject indexes of Computer Program Abstracts and constitute a Retro search.

Searches of the NASA, CONDENSATES, and CHEMICAL TITLES tapes are performed by the KASC utilizing the systems of the Computer Center of the University of Pittsburgh. Searches of the DDC and COMPENDEX tapes are performed for the KASC by other NASA RDCs utilizing their computer systems, the results of which are transmitted to KASC either by TWX and through the U. S. mails. COSMIC computer programs are searched manually by KASC staff.

IV. MARKETING FOR THE RDC

John E. Matenkosky

OBJECTIVES

The goal of KASC Marketing is to bring in sufficient business to achieve and to maintain a cost recovery position for the Center. This report provides the details of efforts toward the achievement of this goal, which were made in two directions: maintaining existing business and selling new business.

Maintaining existing business was done primarily through direct contact with the clients. Marketing, Technical Analysis, and Engineering Consultant personnel participated in this activity, which is intended to inject a personal note into the KASC/NASA program, and to identify potential problems in the KASC/client relationship.

The new business sales activity of Marketing depended largely on direct mail to bring in sales leads. Several kinds of mailing lists, mailing pieces, and enclosures were tried in an effort to identify the important variables affecting the success of this approach. Sales leads were followed by telephone, and appointments for presentations were set with promising prospects. The Letter of Intent was used as a preliminary, but non-binding, commitment to permit profile phrasing activities to begin before a formal agreement had been reached.

During the last quarter, KASC was assigned the responsibility of operational activities for the Chemical Abstracts Service files, CA Condensates and Chemical Titles. With the advent of the NASA/RDC Communications Network, and the availability of the Department of Defense Documentation Center and Engineering Index files, as well as the COSMIC computer program service, the new business sales activity has become much more

broadly based. Initial moves have been made toward publicizing the availability of these new sources of information, and the RDC network has already proven to be of great value in the interchange of information on these services.

The results of these attempts to achieve the cost recovery goal are documented in order to help guide the formulation of improved marketing policies and practices. By comparing results achieved to goals, considering the environment and the resources allocated, obstacles can be identified in order to provide a more firm basis for plans for the future.

PERSONNEL

Since August, the KASC Marketing Department has consisted of two experienced marketing representatives and two secretaries. Prior to that, a marketing manager and his secretary made up the sales team.

The Marketing Department is responsible for the planning, development, and implementation of sales and promotional activities. Although four people are directly involved, several others are available as required to assist in the promotion of the KASC Information Services. These include Professor Allen Kent, Director of the Center, and now Director of Communications Programs for the University; Edmond Howie, Assistant Director for Operations; and Walter Turkes, Associate Dean of the School of Engineering. The technical competence and abilities of these men are well known, since they have long been associated with the KASC RDC activity, they are strong supporters of the Technology Utilization Program.

In addition, other members of the KASC staff and the Engineering faculty consultant group are able to contribute a great deal to conferences and workshops, and have added their special talents to the marketing efforts during the past year.

Various services of the University are available for our use, including the Mailing Center and the Program Development and Public Affairs Department. These groups have helped to implement the direct mail and publicity programs, and will continue to be utilized as much as possible in the future.

TOOLS OF MARKETING

The tools utilized by KASC Marketing during the past year included the following:

- Direct Mail
- FIRM Package
- Personal Sales Presentations
- Group Sales Presentations
- Letter of Intent
- KASC Brochure
- EDN Caravan
- Advertising
- Periodic Clientele Contacts

Direct Mail

Direct mail continued to be the prime source of prospective clients. Several different projects were utilized during the past year to test the effects of variations in the mailing pieces, the enclosures, the mailing lists used, the follow-up procedure and its timing, all with the goal of increasing response. Since direct mail is a continuing effort, the results of several test programs are incomplete, pending sufficient time for replies to be received and results tabulated.

The Projects

During the past year, the KASC direct mail activity included five distinct projects. Each of these projects was directed toward a specific market with a specific objective in mind. Each project utilized slightly different procedures and mailing pieces in order to best exploit the characteristics of the market and of the mailing list employed. A summary is shown in Figure 4-1.

Project A:

This first project was under way at the beginning of the year and continued in segments during the course of the contract period. The mailing pieces used were three personal letters, addressed to corporate officials whose names were derived from a Dun & Bradstreet listing. Companies were selected on a geographic and SIC code basis, in order to optimize our chances for a favorable reply.

The letters used, called the Initial, the First Follow-Up, and the Second Follow-Up, are shown as Exhibits 4-1, 4-2, 4-3. They are designed to impress a corporate officer, director of research, or head of engineering with the need for and the importance to him of participation in the KASC/NASA technology Utilization Program. If no reply or a negative response was received, the file card with that name was removed from active status.

Approximately 2155 pieces were sent to 850 addressees during the course of this project. The net positive response was 15 replies, or 0.7%.

Figure 4-1. Direct Mail Project Summary

Project	Approach Utilized	Market	Mailing Lists	Addressees	Pieces Sent	Positive Response	Per Cent Positive
A	Three Consecutive Letters	Industrial	Dun & Bradstreet	850	2155	15	0.7
B	Three Consecutive Letters	Research	Industrial Research Directory	700	1750	30	1.7
C	Three Consecutive Letters (Announcement sent first, but not tabulated)	Chemical	Dun & Bradstreet Materials Engineering Current Clients Past Clients	200 250 100 250	590 740 295 740	3 12 8 5	0.5 1.6 2.7 1.5
D	Single Letter	Research	Industrial Research Directory	1040	1040	6	0.6
E	Self-Mailer	Information	KASC/PITT	1100	1100	5	0.5
TOTALS							1.0

A method tried to improve response was the Secretary Memo (Exhibit 4-4). This was attached to 151 pieces and a 2% positive result was achieved on this sample. Since this was a significant improvement on the overall figures, the memo will be utilized in the future on a larger sample.

Project B:

The same series of letters used in Project A were sent to 700 names taken from the Bowker Industrial Research Directory. The positive replies totaled 30 out of the 1750 pieces mailed, for a 1.7% response. This improvement in response can be attributed directly to the mailing list, since all other conditions remained the same and the mailings went out over a long period of time. It appears that the Dun and Bradstreet list is too general for our purposes, and that it does not lend itself to the screening which can be applied to the Industrial Research Directory in terms of company size, type, research activity and so on.

Project C:

This project utilized a procedure similar to that of Projects A & B, in that a three consecutive letter approach was utilized (Exhibits 4-5, 4-6, 4-7). However, the letters were aimed at the chemical market, and were preceded by an announcement of the Chemical Abstracts Service file search capability (Exhibit 4-8). The letters then incorporated the availability of the CA Condensates, Chemical Titles, Engineering Index, and DDC files, while concentrating on the benefits available to a company from sharing in these information resources.

Because of the nature and content of these letters, they were sent to a variety of addressees, all of which were considered prospects for chemical information. A Dun & Bradstreet list of top executives in the chemical process industry, SIC code 28, provided 200 names. Our own files contributed the names of 100 current clients and 250 names came from our Materials Engineering magazine file. The latter file contains the names of those who have requested, from the magazine, packets of information made up and sent out by KASC. These are the results of questions entered by the magazine staff for the purpose of offering to the readers a source of current technical information. The list was screened to identify individuals in companies which are chemically oriented.

As might be expected, the positive replies from the Dun & Bradstreet source were much less than from the others. Overall, this project resulted in a 1.2% positive response to 2365 pieces of mail.

The business reply piece (Exhibit 4-9) was included with each of approximately 600 initial letters, and it was used by 1/3 of those who responded. It would appear that interested prospects will be more likely to write or to call than to utilize a reply card. These will not be used with subsequent mailings of this type. However, the card itself is worded as an invitation, and, as such, will be tried as a separate mailing piece.

Project D:

A special one page letter (Exhibit 4-10) was prepared for 1000 names taken from the Bowker Industrial Research Directory. The companies were chosen on the basis of size and geographic proximity to KASC.

No follow-up procedure was used on this project, because the initial letter used in the other projects generally drew more than twice as much response as either of the two follow-up letters. We decided to try to reach three times as many individuals with a given expenditure, rather than to send a series of three letters. Results to date show 0.6% positive response. However, this must be considered incomplete, since the first mailings were not made until mid-January, and the last was at the end of February.

Project E:

A special self-mailer, called the KASCABILITY Flyer (Exhibit 4-11), was prepared to send to a KASC list of some 1100 Information Scientists. Because these people are generally aware of the advantages of utilizing an information service, the message was designed to quickly emphasize the ability of KASC (KASC-ability) to provide relevant technical information. The full range of data files and related services is outlined to encourage utilization of these services by this group of knowledgeable people.

This project has resulted in a positive response of 0.5% to date, but, having been started later in the last quarter, this project and its results are incomplete.

Summary of Responses

These direct mail projects and their results for the year are tabulated in Figure 4-2. Overall, approximately 8500 pieces of direct mail were sent to nearly 4500 addressees. A total of 84 positive responses were received, which represents a 1.0% return.

FIRM Package

In order to provide information on all of the KASC Information Services, a temporary general catalog called the FIRM (File Inquiry Response Mailing) Package has been prepared. It is utilized not only for presentations, but is sent to those prospects who request information on our files. In addition, it is sent to prospects ahead of the appointment date if several weeks will pass before the presentation is scheduled.

Revisions to the FIRM are made as necessary in order to keep it current. Through constant use and revision, it will be refined to the point where it can serve as a model for a printed KASC General Catalog.

The FIRM contains a short introduction to KASC and then presents each file individually, showing content, origin, value and cost of the following:

- The KASC/NASA Technology Utilization Program
 - Retrospective Searching
 - Current Awareness Service
 - Custom Profiles
 - Standard Interest Profiles
 - KASC Oriented
 - ARAC Oriented

Figure 4-2. Mailing Piece Response Summary

Project	Mailing Piece	Addressees	Positive Response	Per Cent Positive
A	Initial Letter L1 Follow-Up I for L1 Follow-Up II for L1	850	11	1.3%
		650	3	0.5%
		735	1	0.2%
B	Initial Letter L1 Follow-Up I for L1 Follow-Up II for L1	700	20	2.8%
		550	7	1.2%
		500	3	0.6%
C	Initial Letter L2 Follow-Up I for L2 Follow-Up II for L2	800	16	2.0%
		785	5	0.7%
		780	7	0.8%
D	Single Letter	1140	6	0.6%
E	Self-Mailer	1100	5	0.5%

- The Chemical File Search Services
 - Custom Current Awareness Service
 - CA Condensates
 - Chemical Titles
- The Engineering Index Compendex
 - Limited Retrospective Searching
 - Electrical/Electronics Section
 - Plastic Section
 - Current Awareness Service
 - Custom Profiles
 - Standard Interest Profiles (ARAC)
- The Department of Defense Documentation Center File
 - Retrospective Searching
 - Custom Current Awareness Service
- The COSMIC Computer Program Service

Sales Presentations

Once a prospect has been identified and qualified, an appointment is made to present the KASC sales story. The format of the presentation varies according to the type of individual, his position, his company, and other factors which must be determined by the marketing representative. The content of the presentation includes a discussion of the need for information, the ability of KASC to supply it, the goals of the NASA Technology Utilization Program and some of its results, and the potential value of our technical information resources to the prospect.

A flip chart has been prepared to provide visual aids for the presentation. It includes charts on the NASA file content and origin, samples

of the forms utilized to initiate and process a search, and copies of abstracts and documents. This has been valuable in helping a prospect to visualize how we perform our services for him, which is particularly important if he is unable to visit KASC himself.

Copies of the material in the flip chart are left with the prospect as a reminder, along with the KASC brochure (Exhibit 4-12) and the NASA booklet, Useful New Technology. A copy of a Standard Interest Profile of potential value to the prospect is used to show the format and content of the NASA file, while relating its value directly to him.

The purpose of this activity is, of course, to sell. If the marketing representative cannot close the sales during the course of the presentation, he must endeavor to keep the door open by maintaining the interest of the prospect. This can be done by sending additional information, such as samples of profiles or special publications related to his interest. A copy of a contact report form is placed in a tickler file in order to make sure that the prospect receives such attention periodically, unless it is decided that he is no longer a good prospect. At this point, the prospect file becomes part of a dead file. Our plans are to enter the name of this prospect on a customer/prospect mailing list tape, so that he will continue to receive service announcements from KASC.

Letter of Intent

If the presentation has been an apparent success, but the prospect has not yet actually entered a question, Marketing attempts to have him sign a Letter of Intent (Exhibit 4-13). This standard form

indicates a desire or willingness on the part of the prospect to enter the program. Although not legally binding, the commitment is considered to be sufficient to warrant the expenditure of time for further negotiations with the prospect.

A variation of this form is sent to clients with a cover letter (Exhibit 4-14) as the first step in the renewal of an existing contract. Because of the possible delay in the approval of a contract or purchase order, the completion of this form allows service to be continued past the normal expiration date of the contract.

KASC Brochure

The new brochure (Exhibit 4-12) prepared during early 1969 is used primarily as an enclosure when mailing information on the Center to prospects or to clients. A reader is led from a discussion of the problems of advancing technology and of the information explosion to the manner in which KASC services can help him to meet these problems. This is particularly effective where the prospect or client has not had an opportunity to visit the Center, since the activities are well described and graphically portrayed to emphasize the ability of KASC to provide valuable assistance to him.

EDN Caravan

Electronics Design News magazine sponsored a road show consisting of two semi-trailers full of displays of the products and services of electronics-oriented manufacturers. This caravan visited industries in the area served by KASC during early November, and the marketing

representatives spend nearly two weeks helping to man the NASA display. Management personnel in the industries visited were also contacted whenever possible.

The literature distributed and contacts made resulted in six (6) inquiries, but no sales have resulted from those efforts.

Advertising

Although no direct advertising was done during the past year, a publicity article was written on the activities of KASC by the Pittsburgh Press. This article, featuring an interview with Professor Allen Kent, appeared in the newspaper on Sunday, July 27. Two inquiries actually resulted from this publicity, but they were both of a curiosity nature and not from genuinely interested prospects.

The Materials Engineering magazine cooperative plan is still in operation. Under this plan, the magazine offers to its readers each month a packet of abstracts which is the result of a KASC search of a profile of potential interest to those readers. The abstracts are sent directly to the reader by KASC in response to a memo from the magazine. These memos, which represent a group of people who have been introduced to the KASC/NASA program, have been used as a mailing list. Several leads have been used as a mailing list. Several leads have come from this effort, and additional publicity value is obtained from the short discussion of the program printed each month in the magazine (Exhibit 4-15).

Periodic Clientele Contacts

Periodic contact with KASC clients is made by both the Marketing and the Analysis groups. The contacts initiated by Marketing are concerned with the renewal of existing contracts and the expansion of our services within the client organizations. Calls are also made concerning new or changed profiles and about problems related to our operation.

Clients are encourage to contact the marketing representatives any time they have a problem area where KASC might be able to be of assistance. The immediate result of such a call might be a discussion with marketing or one of the subject specialists, or a referral to another source, such as a Technology Utilization Officer at a NASA installation. The final result may be a new profile; if not, this activity is at least another expression of our interest in the client. As such, it is an investment in future business for KASC.

Summary of Contacts

The contacts made by KASC Marketing with both customers and prospects during the past year were as follows:

MARKETING CONTACT SUMMARY					
	MAY To MAR	JUN To AUG	SEP To NOV	DEC To FEB	TOTAL
Direct Mail Pieces	1027	1573	2820	2990	8410
Telephone Calls	34	53	185	154	426
Sales Presentations	37	17	33	28	115
Correspondence	27	27	84	175	313
TOTALS	1125	1670	3122	3347	9264

INDUSTRIAL INCOME

The total industrial income for the calendar year 1969 and the first two months of 1970 is shown in Figure 4-3. Derivation of monthly income is based on total purchase order (or contract) value divided by the number of months in the service period. For example, a purchase order with a face value of \$1200 for 12 months service is considered as equivalent to \$100 a month for each of 12 months. Continuing service income is calculated as beginning with the first search period of service to a client and ad hoc funds are considered as income for the month in which the service was performed.

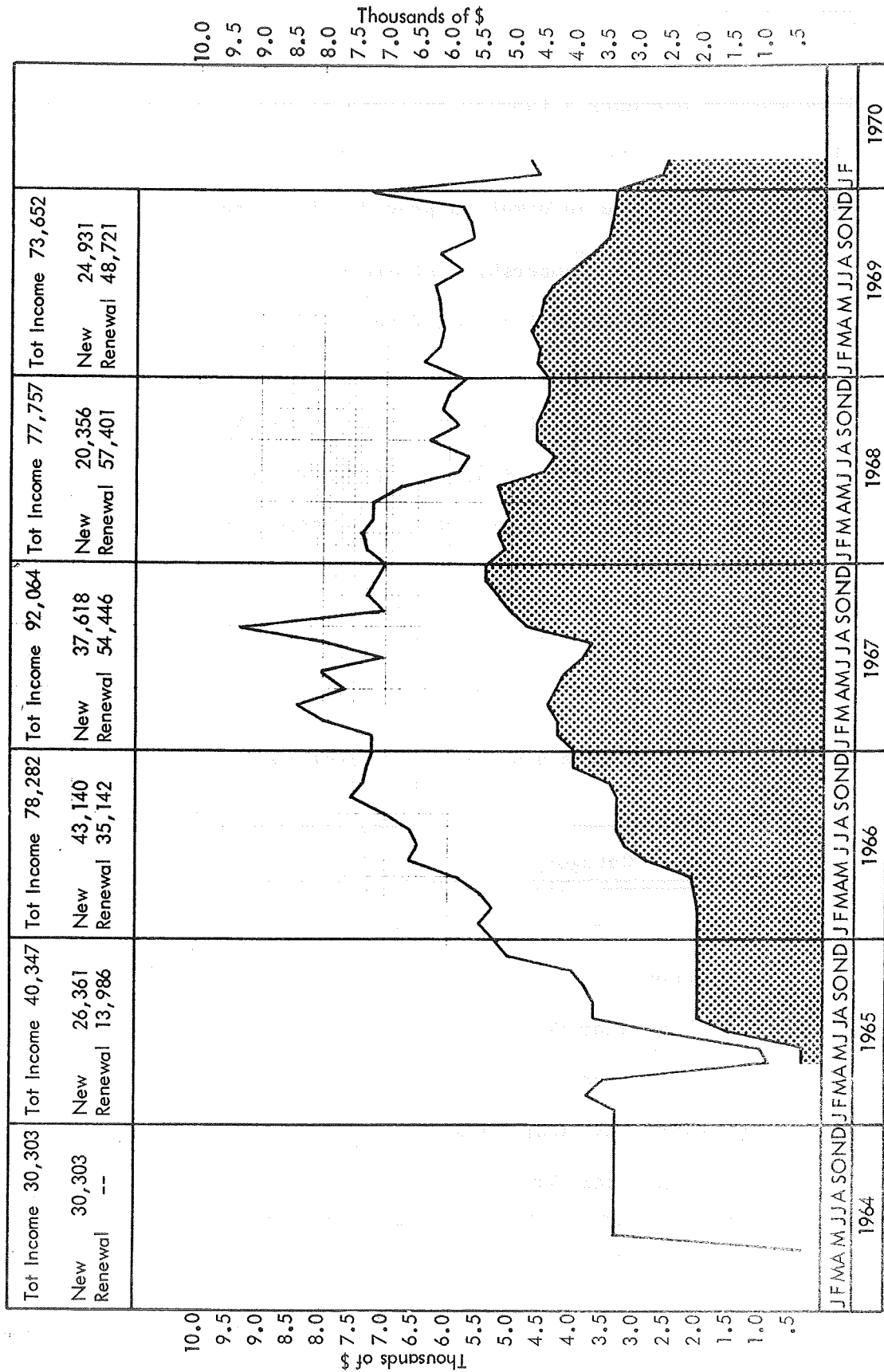


Figure 4-3. Total Industrial Income

KASC CLIENTELE

This section presents a tabular analysis of the composition of the clientele of the Knowledge Availability Systems Center, both current and historical. The information provided is as follows:

- KASC RDC Membership (Figure 4-4)
- Client Classification (Figure 4-5)
- Client Composition, Geographic (Figure 4-6)
- Client Composition, Size (Figure 4-7)
- Client Composition, Type (Figure 4-8)
- Client Composition, SIC Code (Figure 4-9)

Figure 4-4. KASC RDC Membership

Category	Number
New, First-Year Companies	43
Second-Year Companies	7
Third-Year Companies	6
Fourth-Year Companies	7
Fifth-Year Companies	5
Sixth-Year Companies	5
TOTAL	73

Figure 4-5. Client Classification

TYPE	1964	1965	1966	1967	1968	1969	1970 ⁺
New	10	35	25	19	18*	25*	1
Renewal	--	8	23	34	33	27	4
One-Time Contracts	--	1	3	7	7	18	3
Dropouts	--	2	14	19	18	20	--
Delinquent**	--	--	6	2	1	1	8
In Process***	--	--	--	--	--	2	39
TOTALS	10	46	71	81	77	93	55

+ First two months only.

* Includes companies whose contract periods began and expired in the same year. These companies are not included in the dropout statistics in order to avoid duplication.

** Contract period expired but service continued during negotiations.

*** Companies whose contracts are overlapping from the previous year and are not yet up for renewal.

Figure 4-6. Client Composition, Geographic

STATE	1964	1965	1966	1967	1968	1969	1970*
Colorado						1	1
Connecticut			1	3	2	1	1
Delaware					1	1	1
Dist. of Columbia							1
Illinois					2	6	1
Maryland			2	3	4	5	2
Massachusetts		1	3	2			
Michigan		1	1	1	2	3	2
Missouri				1			
New Hampshire				1			
New Jersey		1	5	7	7	7	3
New York			2	5	4	6	3
Ohio		5	6	9	8	7	5
Pennsylvania	9	37	51	48	44	52	33
Texas				1	1		
Virginia					1	1	
West Virginia	1	1			1	1	1
Wisconsin						2	1
TOTALS	10	46	71	81	77	93	55

*First two months only.

Figure 4-7. Client Composition, Size

SIZE	1964	1965	1966	1967	1968	1969	1970*
Large	10	30	47	53	52	55	35
Small**	--	16	24	28	25	38	20
TOTALS	10	46	71	81	77	93	55

* First two months only.

** Under 1,000 employees

Figure 4-8. Client Composition, Type

TYPE	1964	1965	1966	1967	1968	1969	1970*
Manufacturing	9	43	68	71	66	78	48
Research and Development	1	3	3	9	9	8	4
Nonindustrial	--	--	--	1	2	7	3
TOTALS	10	46	71	81	77	93	55

* First two months only.

Figure 4-9. Client Composition, SIC Code

CODE NO.	CATEGORY	1964	1965	1966	1967	1968	1969	1970*
13	Petroleum, Gas Products				1	1		
14	Mining, Quarrying					1	1	1
16	Construction (Non-Building)	1	1	1	1			
23	Apparel and Fabric Products						1	
26	Paper and Allied Products					2	2	
27	Printing, Publishing				1	2	1	1
28	Chemical Products		4	7	7	8	8	5
30	Rubber, Plastic Products		1	3	3	1		
32	Stone, Clay, Glass Products	1	1	2	2	3	5	5
33	Primary Metal Industries	6	18	17	16	16	16	9
34	Fabricated Metal Products		1	8	8	1	4	5
35	Machinery (Non-Electric)		5	8	6	9	16	11
36	Machinery (Electric)	1	12	16	19	17	12	7
37	Transportation Equipment			1	2	1	2	2
38	Instruments (Photo, Optical)		1	5	6	4	6	2
39	Miscellaneous Manufacturing						2	2
48	Communications						1	
73	Research (Commercial)	1	2	3	6	8	10	4
82	Miscellaneous Services						2	1
86	Non-Profit Organizations						1	
89	Research (Non-Profit)				2	1	2	1
91	Federal Government				1	2	1	1
	TOTALS	10	46	71	81	77	93	55

* First two months only.

V. OPERATIONS OF THE RDC

Guy W. McGee

Elizabeth P. Hartner

TECHNICAL ANALYSIS

Personnel

The Technical liaison staff has two parts. Nine members of the Engineering school faculty, headed by Dean Walter R. Turkes, consult with client engineers to phrase questions, discuss results and changes, and review output for Type III profiles. These Engineering faculty members represent the following disciplines:

Chemical Engineering,
Mechanical Engineering,
Materials Engineering,
Electrical Engineering,
Industrial Engineering, and
Civil Engineering.

In addition, the KASC staff has three full-time and four part-time scientists and engineers who function as technical liaison with client engineers and Engineering faculty to phrase questions, discuss results and changes, review output for Type III and IV questions, and code strategies for all profile types for computer searching. The KASC staff members have training and experience in the following disciplines in addition to the field of Information Science:

<u>Discipline</u>	Number of Staff Members (full and part-time)
Chemistry	5

Physics	2
Engineering	2
Biology	1

Preparing Search Strategies

Search strategies prepared for the NASA base are in Boolean logic.

The terms are acceptable in two indexing bases:

1. Thesaurus -- used for tapes from January 1968 to date and
2. Subject Authority List -- for tapes before January 1968.

The Boolean OR and AND logic is used. Up to three nested parenthetical Boolean expressions may be used. Neither NOT logic nor term truncation is available. Adjunct tools consist of the term postings for both index bases, as well as the monthly listing of index terms for each accessioned document.

Table 5-1 shows the number of new strategies and the number of strategy revisions by the month for the contract year 1969-70.

During the last quarter of the contract year searches of the CONDENSATES tapes was undertaken on the cost recovery basis both for KASC clients and for other NASA Regional Dissemination Centers. With Volume 72, Issue 7, in February, 1970, we began to search CONDENSATES using the IBM Text-Pac program. This necessitated the conversion of all strategies which had originally been written in the Chemical Abstracts Service format, to the Text-Pac code. Twenty-seven cost

Table 5-1. NASA Strategies Written

MONTH	NEW	REVISED
March	18	} 53*
April	18	
May	13	
June	46	26
July	18	23
Aug.	17	25
Sept.	8	N/A**
Oct.	7	7
Nov.	11	13
Dec.	12	31
Jan.	11	16
Feb.	9	24
TOTAL	188	218

* Available only on quarterly basis.

** Not Available

recovery questions were so converted. Coding by IBM Text-Pac permits the use of Boolean logic, right truncation of terms, NOT logic, and the searching of specific fields of information such as title, author, coden, etc. An option of the Text-Pac program produces a listing of the terms on the tape, the number of occurrences of the terms, and the number of documents associated with the term. This listing is used in the same way as postings for closed index systems to permit judgments of how to use the terms in the strategies.

Strategies for searching the Defense Documentation Center tapes at North Carolina Science and Technology Research Center Regional Dissemination Center are prepared using Boolean logic with OR, AND, and NOT, and nested parentheses are available. Two dictionaries have been provided to us with postings, one from 1964 through 1968; the other post - 1968. The postings must be included in the strategy presentation for searching by NCSTRC's format. Two retrospective searches were made of the RDC Network DDC tapes during the year 1969-1970.

During the year, Aerospace Research Application Center of Indiana University made available retrospective searches of the Engineering Index CITE files covering Electrical Engineering and Plastics. Beginning in 1970 the complete COMPENDEX file became available for searching. ARAC also makes available Standard Interest Profiles (SIP) incorporating products from the NASA base and Engineering Index, but no ARAC SIPs were provided to our customers during 1969-70. The COMPENDEX file will be searched by heading and subheading index terms,

such as appear in the published Engineering Index.

Manual Searching

Manual searching is performed on the monthly STAR and IAA journals for Type III service profiles for which no accessions are cited by the computer. If pertinent material is found, the indexing of the pertinent accessions are checked and the strategy modified, if possible, in line with this indexing. In addition, a monthly listing of newly received Tech Briefs and NASA publications is scanned by each reviewer and pertinent Briefs or documents are added to the computer listing of accessions for all Type III service profiles. Copies of the Briefs or documents are then included with the computer output.

During the first half of the year 1969-1970, Nuclear Science Abstracts and United States Government Research and Development Reports were examined by the KASC staff for material relevant to Type III service profiles to be brought to the attention of the user. This effort was made to acquaint our clients with the possibilities of DDC searches. The manual search was discontinued when search services for the DDC tapes were made available through the RDC Network.

Until the end of December, 1969, manual searches for profiles of narrow and specific scope were made of subfiles of the NASA tapes generated on the following subjects:

- Polymers

- Steels
- Powder Metallurgy
- Lubrication
- Composites
- Joining Techniques
- Surface Treatment

In preparation for a reformat of the computer output for the NASA tape which will utilize preprinted forms that serve as evaluation sheets, subfile searches were discontinued and separate strategies were written for the profiles previously searched manually against one of the subfiles listed above.

Table 5-2 shows, by the month, the numbers of manual searches of journals made as a result of "no citation" mechanical searches and of the subfiles for narrow specific questions.

Reviewing of Search Output

Table 5-3 shows how many profiles were reviewed on the NASA base, by the month, for current awareness searches and, by the quarter, for retrospective searches.

A study of the subject area interests of our clients' profiles was performed in order to evaluate the capabilities of the Technical Analysis staff as new profiles were added to the system and old profiles

Table 5-2. Manual Searches

MONTH	NO CITATIONS	SUBFILES
March	19	24
April	17	16
May	13	13
June	14	13
July	13	13
Aug.	11	11
Sept.	7	7
Oct.	8	8
Nov.	5	5
Dec.	5	5
Jan.	8	16
Feb.	12	0
TOTAL	124	131

Table 5-3. Number of Questions Reviewed

MONTH	CURRENT AWARENESS	RETROSPECTIVE
March	311	} 26
April	300	
May	284	
June	259	} 16
July	266	
Aug.	246	
Sept.	224	} 18
Oct.	224	
Nov.	212	
Dec.	202	} 14
Jan.	197	
Feb.	189	
TOTAL	2914	74

Table 5-4. New and Cancelled Questions by Subject

SUBJECT	NEW	CANCELLED	NET CHANGE
Powder Metallurgy	7	0	7
Fluid Flow	11	5	6
Sound, Acoustics, Radio	4	1	3
Biology, Medicine	4	2	2
Ceramics, Glass	3	2	1
Geology, Oceanography	1	0	1
Information Science	1	0	1
Lubrication	3	2	1
Composites	7	7	0
Inorganic Chemistry	3	3	0
Nuclear Chemistry	1	1	0
Aerodynamics	0	1	-1
Pumps & Valves	0	1	-1
Non-ferrous Metallurgy	2	3	-1
Plasma Physics	0	1	-1
Spectroscopy & Chemical Analysis	0	2	-2
Electronics	11	13	-2
Ferrous Metallurgy	1	3	-2
Inspection, Testing	9	11	-2
Optics, Lasers	2	4	-2
Metal Forming	5	7	-2
Microscopy	0	2	-2
Physical Chemistry	2	4	-2
Polymers	10	12	-2
Photography	0	2	-2
Management	3	7	-4
Welding & Joining	5	9	-4
Mathematics, Statistics	1	5	-4
Coating & Corrosion	10	15	-5
Mechanical Engineering	0	5	-5
Chemical Processing	2	9	-7
Physical Metallurgy	7	14	-7
Control-Computers	4	14	-10

cancelled. Table 5-4 lists the subject areas in which both new and cancelled profiles have occurred during the year. The total number of new and cancelled profiles is too small compared to the number of subject areas to permit conclusions about growth and depletion tendencies. No change in the reviewing staff was considered necessary because of these shifts.

During the month of December, CONDENSATES searches on a cost recovery basis were made available beginning with the first issue of 1970. Through the Pittsburgh Chemical Information Center many profiles had received prior service on an experimental basis and, therefore, successful strategies for them were already available. In all, thirty-seven profiles were introduced for service, five of which were for other NASA RDCs.

The CONDENSATES feedout for a new profile is monitored by an analyst for the first three runs to insure the adequacy of the search strategy. Changes made thereafter must be initiated by the client. During the month of February the use of Text-Pac for CONDENSATES searches was initiated. All strategies for the profiles required conversion, with a subsequent review of three CONDENSATES searches for each profile.

Table 5-5 illustrates the section of the Chemical Abstracts journal most closely representing profiles now receiving CONDENSATES search services.

Table 5-5. Subject Interest of Chemical Condensate Cost Recovery Searches

	C.A. Section Subject Area		Number of Questions
ODD Issues	8	Microbial Biochemistry	1
	10	Animal Nutrition	1
	16	Fermentations	2
	21	General Organic Chemistry	1
EVEN Issues	35	Synthetic High Polymers	3
	36-37	Plastics, Manufacture & processing,	
		Processing, Fabrication & Use	5
	38	Elastomers, including Natural Rubber	1
	42	Coatings, Inks, & Related Products	2
	47	Apparatus & Plant Equipment	1
	48	Unit Operations & Processes	1
	52	Coal & Coal Derivatives	2
	53	Mineralogical & Geological Chemistry	2
	54	Extractive Metallurgy	1
	55	Ferrous Metals & Alloys	1
	56	Non-Ferrous Metals & Alloys	1
	57	Ceramics	1
	59	Air Pollution & Industrial Hygiene	2
	66	Surface Chemistry & Colloids	1
	70	Crystallization & Crystal Structure	3
	71	Electric Phenomena	1
	73	Spectra & Other Optical Properties	1
	79	Inorganic Analytical Chemistry	2

Technical Profile Liaison

To monitor the quality of search service supplied to the clients, and to document evidences of technology utilization, liaison relative to the technical content of the profile is necessary between the ultimate user of the results and the KASC technical representative.

Contacts are made by the KASC representative when evaluations received show low precision, when evaluations of Type III service indicate items are of interest to the client that the KASC subject specialist did not consider to be relevant to the profile, and when comments are placed on the evaluation sheet by the user. These contacts are recorded and the necessary action, search statement change, or strategy change initiated.

Marketing Support

Evaluations of the files for potential clients are made by members of the Analysis Section upon request of Marketing. These evaluations usually require some manual searching of the subject indexes. Occasionally a partial or complete retrospective search is made of the file and delivered to the potential client as a sample search.

Additional support is provided to Marketing by the Analysis Section through discussions with potential customers of their interests. These discussions result in definitive statements of interests for more easily

defined profiles. The discussions may occur at the offices of the KASC, by telephone, or at the client's location.

Marketing demonstration materials for files, the methods of searching, and the end product are also prepared by the Analysis Section.

TECHNICAL OPERATIONS

The mission of Technical Operations is the timely processing of all inquiries, from initiation of search services to submission of requested documents. The group personnel perform all the manual tasks associated with the group's mission, including the compilation of statistics related to system performance and effectiveness.

Personnel

The personnel complement for the technical operations group comprises one supervisor (B.S. in Chemistry and a Masters in Library and Information Science), eight full-time and four part-time nonprofessional employees.

In general, daily operations relating to search services and document service, respectively, are delegated to each of two assistants to the supervisor; the manual compilation of records is assigned to three clerks --two for the search service and one for the document service; duplicating activities are assigned to two other clerks; and the seventh full-time person has responsibility for operations of the data handling equipment such as keypunches, sorters, duplicators and accounting machines and for ensuring prompt delivery and return of all materials to be processed at the Computer Center.

One of the part-time staff is assigned primarily to duplicating functions; two to duplicating, packaging and shipping functions; and the last member

of the group is the messenger boy who also performs filing tasks.

The assignments of all personnel are shifted as required to meet the established goals for the different data files for which KASC offers search services. For the NASA file the goal is a three-week time cycle for complete processing of all current awareness profiles (approximately 360), and a maximum ten-day cycle (minimum 48 hours) for retrospective service. On the CONDENSATES and Chemical Titles files, processing of all current awareness profiles (approximately 40) is expected not to exceed ten days. A lack of experience prevents a realistic establishment of service goals for the Defense Documentation Center file and the Engineering Index COMPENDEX file; however, a cycle of not more than ten days has been tentatively set for these as well.

Service

Two basic services are offered by the KASC consisting of search services and document service. Variation of the former based on differing search and service types, described below, provide flexibility to meet the search needs of differing clients while the options of hard copy and microfiche copy for the latter permit the client to choose the document medium which he desires and is equipped to utilize.

Search Types

The search type is one variable of the search services provided by the KASC and it exists in one of the three variations:

- Retrospective
- Current Awareness
- Retrospective plus Current Awareness

The Retrospective Search (Retro) is a search of a document file, in whole or in part, previous to its most current additions. During the reporting period, the KASC offered retro searches for the National Aeronautics and Space Administrations (NASA) file (unclassified) from 1962 to the present and for the Defense Documentation Center (DDC) file (unclassified) from 1964 to the present.

The Current Awareness Search (C/A) is a search of only the most current additions to a document file performed at the periodic intervals for which a magnetic tape is issued containing the analytics of documents added to the file after the last tape was issued. The intervals of issuance of these magnetic tapes may differ for each document file. The NASA, DDC, and Engineering Index (COMPENDEX) files are updated on a monthly basis, the Chemical Titles (CT) file is updated 26 times a year, and the CONDENSATES file is updated weekly. A C/A search is seldom obtained by a client on an ad hoc basis; the client ordinarily contracts for a consecutive series of C/A searches for a specified period of time, usually 12 months. Thus, C/A search service for the NASA, DDC, or COMPENDEX files consists of 12 consecutive searches, while C/A service on CT consists of 26 consecutive searches, and on CONDENSATES it consists of 52 consecutive searches. The KASC offered C/A search service for the NASA file during the entire past 12 months and for the remaining files this service was available during the last quarter of the year.

The Retrospective plus Current Awareness Search (Retro + C/A) is a combination of the two described above but because it has certain economies associated with, e.g. one-time phrasing of the profile, single search strategy, and a single set-up of files and basic records, it is considered as a third search type. During the past year, the search type was available from the KASC for those files for which both retro and C/A service was offered, i.e., the NASA and DDC files.

Service Types

The second search service variable is the service type of which the KASC offers four. The types of service combine with the search types to provide a KASC client with service options distinguished by the search scope (retro, C/A, or retro + C/A) and the search output. Two aspects of the search output define the four service types, the physical and the intellectual, which are apparent in the following discussion of the four types.

Subscribers to Type I Service receive only a computer printout listing those accessioned items in the file whose index terms match the search strategy prepared for the subscriber's profile. Neither bibliographic citations nor abstracts are provided, nor are the search results reviewed by subject specialists. Subscribers must arrange for their own access to the appropriate abstract journals in order to identify and review abstracts of the documents in the file whose accession numbers appear on the computer printout.

Subscribers to Type II Service receive the complete bibliographic citation of all documents identified on the computer printout. In addition, for the NASA, DDC, and COMPENDEX, an abstract of the document is provided as well. As in the case of Type I service, subject specialist talents are used only in preparation of the search strategy. All output, including "noise," is submitted to the client. No review of search results is performed by subject specialists.

Subscribers to Type III Service receive the complete bibliographic citation of all documents identified on the computer printout, plus the abstract for the NASA, DDC, and COMPENDEX files. However, those citations deemed relevant to the client's profile as determined by a subject specialist have been highlighted and separated from the remainder of the citations for the convenience of the client.

Subscribers to Type IV Service receive file output reflecting the general interest of a number of users. It is a current awareness service only and available during the past year for only the NASA and Engineering Index files.

Equipment

The equipment identified below are either leased or owned by the University of Pittsburgh and located within the Knowledge Availability Systems Center of the University of Pittsburgh for use by its RDC activities. In addition, the Center utilizes the IBM 7090 Data

Processing System, the OS 360/50, and other equipment (e.g., accounting and card reproducers) located in the University's Computer Center.

Data Processing

- IBM Card Punch (Type 026)
- IBM Card Sorting Machine (Type 082)
- IBM Tele-Processing Card Reader (Type 1056)
- IBM Tele-Processing Printer (Type 1053)
- IBM Tele-Processing Control Unit (Type 1051)
- IBM Card Bursting Machine (Type 400C)

Copiers

- A. B. Dick 675
- Xerox 3600
- Itek 18.24RS
- Atlantic A-9 Printer
- Atlantic D-22 Diazo Developer

Communication

- Bell Teletyperwriter (ASR 33)

Binders

- GBC 243-KM

The A. B. Dick 675 copier is used almost exclusively for the duplication of abstracts of documents cited in searches of the NASA and DDC data files. For reasons of economy, the KASC reformats NASA tapes and uses its own search program which provides as search output only the accession numbers of citations identified as responding to a particular search strategy. Similarly, searches of the DDC file performed for KASC by the North Carolina Scientific and Technical Research Center (NC STRC) result in search output of only citation accession numbers.

Because practically all KASC clients subscribe to either a Type II, III

or IV service, a file of abstracts in reproducible form is maintained covering the NASA and DDC files. Currently, these abstract files are supplied at cost to the KASC by the Aerospace Research Applications Center (ARAC) of the University of Indiana in Bloomington.

Following the performance of a search of the NASA and DDC files, the computer printout is submitted to nonprofessional personnel who retrieve the abstract card on each of the cited accession numbers and copy the card on the A. B. Dick 675 copier. The abstracts are copied three to a standard 8½ x 11 inches sheet. After duplication, the original card is refiled and the abstract copies are submitted directly to the client or to the assigned subject specialist, depending on the type of service requested.

When items are cited other than those published in the abstract journals which announce the contents of a file, the full page (on which the abstract appears) of the pertinent abstract journal is duplicated on the Xerox 3600 and the full page is submitted as required. This occurs when a subject specialist manually supplements a computer search utilizing journals not related to the data file being searched or when performing a computer retrospective search of the NASA file which contains items relating to medicine and biology that have not been announced in STAR or IAA.

Because the computer search output for the CT and CONDENSATES files consists of full bibliographic citations, no reproduction of abstracts

is performed following a search of these files. For the CONDENSATES file, however, the output is printed on a continuous card form for which machine bursting is mandatory in order to meet the production goal for this file.

The Xerox machine is also used in the production of hard copy of document requests received from participating clients. This procedure is used primarily for requests relevant to documents available to KASC only in their original hard-copy form.

The Itek 18.24RS is used for documents which are available on microfiche. NASA provides KASC with microfiche of all N-documents available in this particular microform. The Itek reader/printer is used to produce hard copy at the rate of two frames per exposure. Unless special arrangements are made, clients receive their documents in two-page-up form.

Microfiche requests are filled using the Atlantic Microfilm A-9 Printer and its companion, the D-22 Diazo Developer.

The KAS Center utilizes the services of the University's Computer Center for computer searches of the NASA, CT, and CONDENSATES tapes. An IBM 7090 system is used in a batch processing mode of operation for the NASA file and an IBM Operating System 360/50 is used for searches of the CT and CONDENSATES files. Execution of the search is almost always performed during late evening hours. Thus, the program and data decks are normally submitted to the Computer Center at the close of one work day and retrieved at the beginning of the next work day.

Scope of Services Provided

A total of 95 different organizations received search services during the 1969-1970 reporting period. Service by data file for the 95 companies was as follows:

NASA	93
CONDENSATES	13
Chemical Titles	2
DDC	2

Figure 5-1 identifies the number of companies serviced on the NASA data file during each service period of 1967, 1968, and 1969 and the first service period of 1970.

Only two organizations received service on the remaining three files that did not also receive service on the NASA file. These two companies received their service during the last quarter of the reporting period which corresponds to the last three service periods in Figure 5-1. Search service on COMPENDEX was available too late in the year for any one organization to take advantage of the service.

A distinction must be made between unique profiles and search profiles (commonly referred to at KASC as 'searches'). During any one chronological year of current awareness service, a client will receive 12 monthly search results for the NASA, DDC, and COMPENDEX files. The issuing organization sends us a magnetic tape each month, and we search

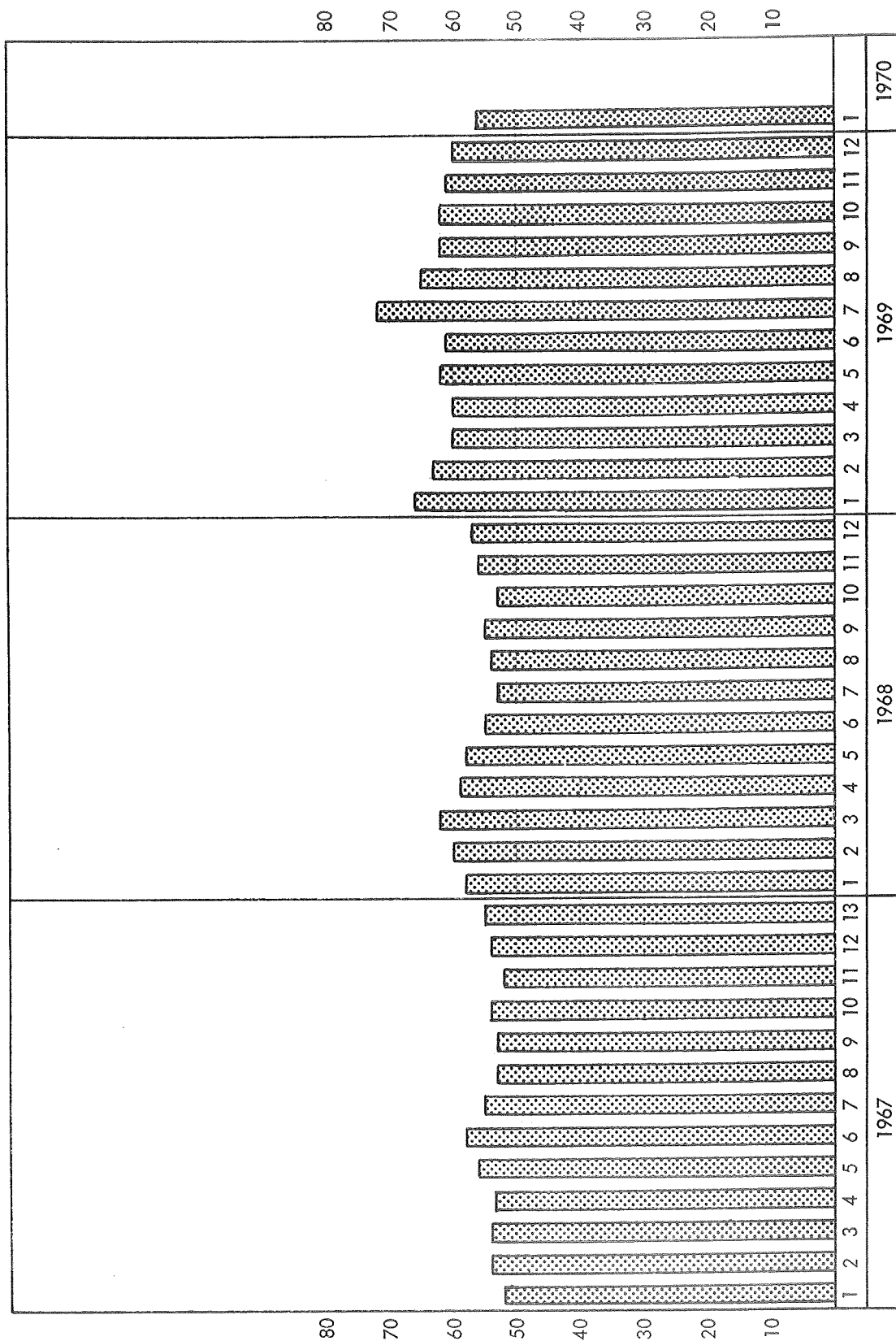


Figure 5-1. Companies Served Per Search Period (NASA)

this tape for accession relevant to each of the active profiles in the system at the time of the search. The quantity of active profiles varies from month to month. New profiles constantly are being introduced and old ones terminated. Thus, the number of 'searches' performed is seldom, if ever, 12 times the number of unique profiles serviced during the year. A similar phenomenon occurs for the CONDENSATES and CT files except that the annual number of searches is 52 for CONDENSATES and 26 for CT.

Unique Profiles

During the reporting period, a total of 626 unique profiles were serviced by the KAS Center. By search service, this total is divided among the various data files as follows:

	NASA	DDC	CONDENSATES	CT
• Current Awareness Only	448	-	33	1
• Retrospective Only	104	2	--	-
• Combination of Both	<u>38</u>	<u>-</u>	<u>--</u>	<u>-</u>
TOTAL	590	2	33	1

We mentioned earlier that in the interest of economy, KASC reformats the NASA tapes. The reformat program 'strips' extraneous (to KASC) information off the NASA tapes and maintains only the accession number of the citation, its associated index terms and the NASA category to which the citation was assigned. Thus, the NASA retro file is compressed so that KASC's NASA retro file comprises seven tapes. Two tapes cover the calendar period April, 1962, through December, 1965; two tapes cover the period 1966 through 1967; one tape each covers the period 1968 and 1969

and the seventh tape covers the current year, 1970, to date. As each monthly tape is received, it is appended to the last retro tape.

In January of 1968, NASA initiated its new approach to vocabulary control utilizing the NASA three-volume thesaurus. At the time, KASC decided to maintain its NASA retro file on the basis of a single tape per year. Thus, a retrospective search of the entire NASA file requires the preparation and utilization of two search strategies and a minimum of two computer runs.

Because the nature of our NASA file does not permit a complete retro with a single pass through the computer, we do not necessarily attempt a complete retro at one time. Frequently, we first perform a 1968 through 1970 search (three tapes). The output of this partial retro search is submitted to the client to be followed in a few days by the remaining portion, 1962-1967, of the file. This two-step process is often utilized at the request of the client so that the search strategy can be evaluated for its effectiveness prior to completion of the search.

Figure 5-2 illustrates the number of unique retrospective profiles introduced into the system for service on the NASA file compared to the number of 'searches' (computer runs) performed. Our statistics for searches are based on the premise that three searches are required for a complete retro. The time spans per search are: (1) 1970-1968; (2) 1967-1966; (3) 1965-1962.

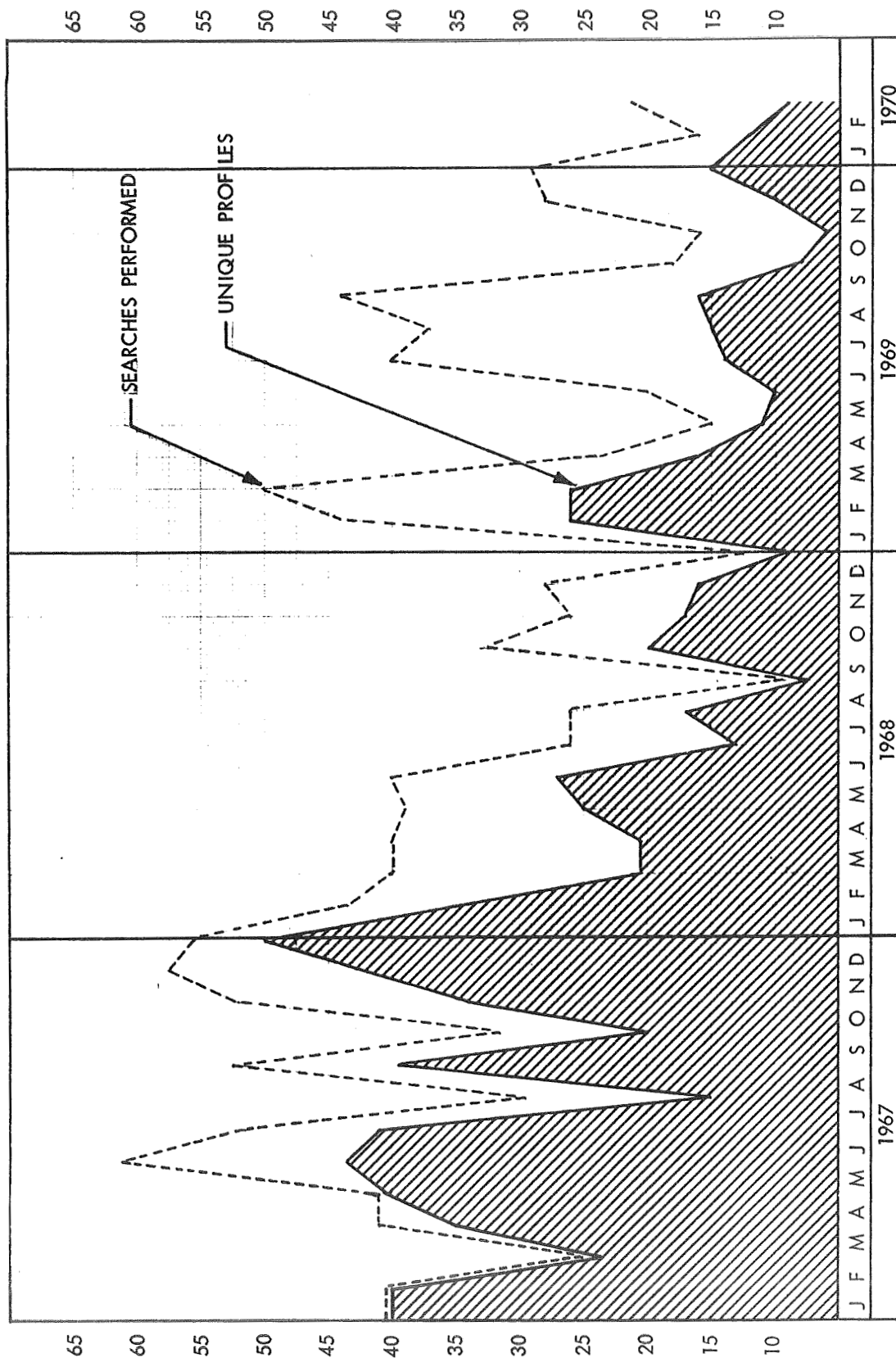


Figure 5-2. Retrospective Profiles (Unique vs. Searches)

The shaded portion of the illustration reflects the number of unique profiles searched in the individual service period. The dotted line reflects the number of searches performed. Thus, in March of 1969 we searched 16 unique profiles. However, these 16 unique profiles required 24 individual 'searches' to satisfy client requests. The 24 individual searches included the 'second' or 'third' portions of some retrospective profiles searched previously against the more recent portion of the file.

Figure 5-3 illustrates per search period the number of unique profiles serviced on a current awareness basis on the NASA file. There has been a continuous decrease in the number of profiles served during the past three years. In part, this decrease is attributed to the introduction of a new fee schedule during the eighth search period of 1968.

Previously, fees were very low and included free document service. The new fee schedule increased fees and made document service a separate cost item. Clients renewing their annual service agreements reviewed their information needs in relation to the options of the new service schedule and associated fees. The more obvious results of these reviews included a consolidation of profiles of narrow scope into a single broad profile (within limits), the cancellation of some profiles experiencing very nominal outputs, and the shifting of current awareness profiles from a Type III service (subject specialist review) to a Type II service (no review at all).

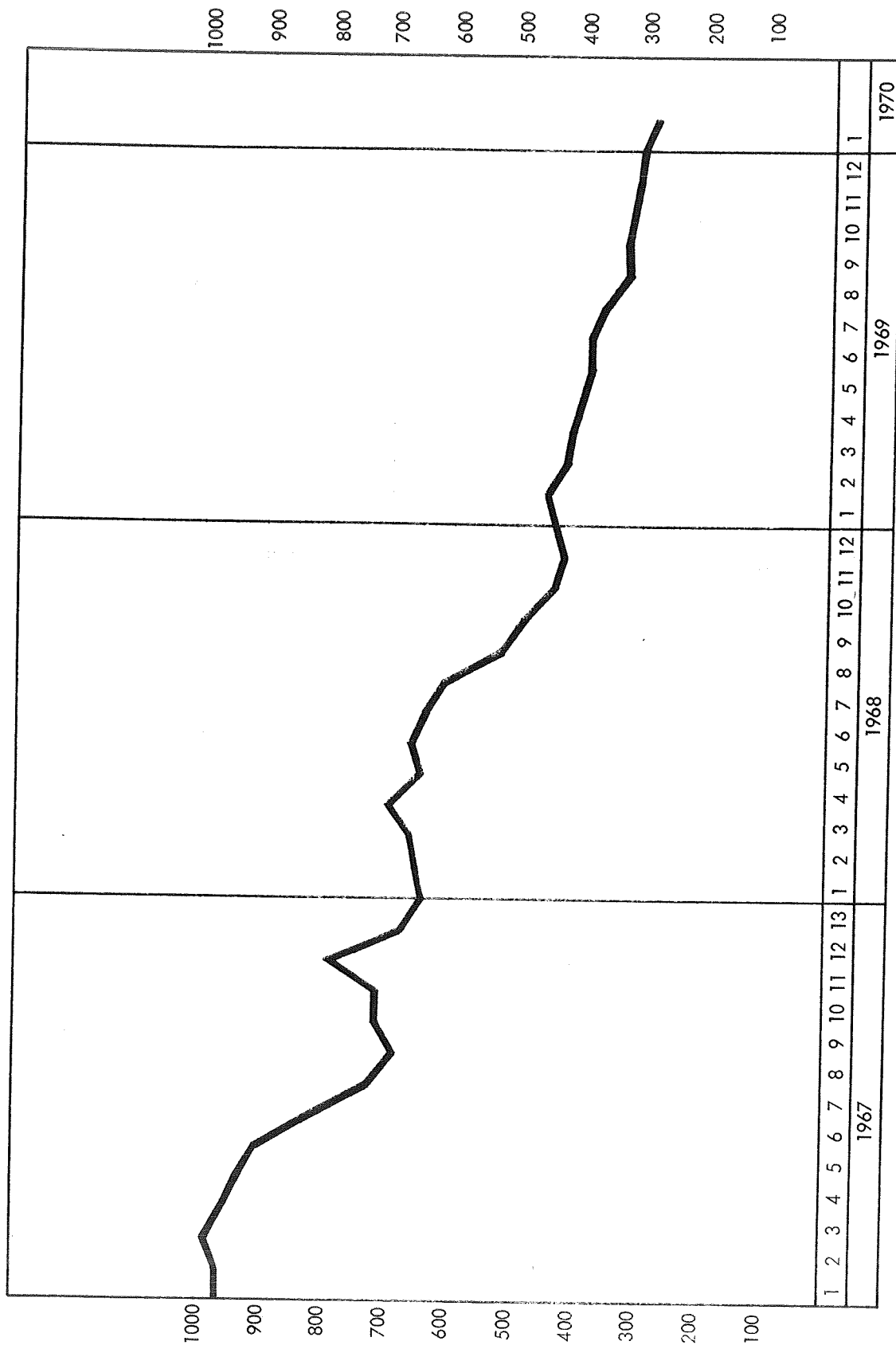


Figure 5-3. Unique Current Awareness Profiles by Search Period

The 36 profiles which received service during the reporting period on data files other than the NASA file are too few for a similar graphical representation. The two which were provided with retrospective service on the DDC file were introduced during the months of April and May of 1969. The computer search of the DDC file was performed for the KASC by the NC STRC. The remaining 34 profiles received C/A service on the CONDENSATES and the CT files, the searches for which were performed by the KASC in conjunction with the Pittsburgh Chemical Information Center of the University of Pittsburgh. The majority of these profiles, 80%, were introduced to the KASC during the last quarter of the reporting period during which time the availability of service on data files other than the NASA file was announced to the general public. Because of this, data relating to the service which these profiles received is too recent and too sparse to incorporate into this report. These data will be incorporated into the next quarterly report.

Profile Searches

A total of 4,620 current awareness and retrospective searches were performed during the reporting period.

	NASA
● Current Awareness	4,311
● Retrospective	<u>309</u>
TOTAL	4,620

Figures 5-4 and 5-5 illustrate the profile load for the NASA file by type of service per search period for both current awareness and

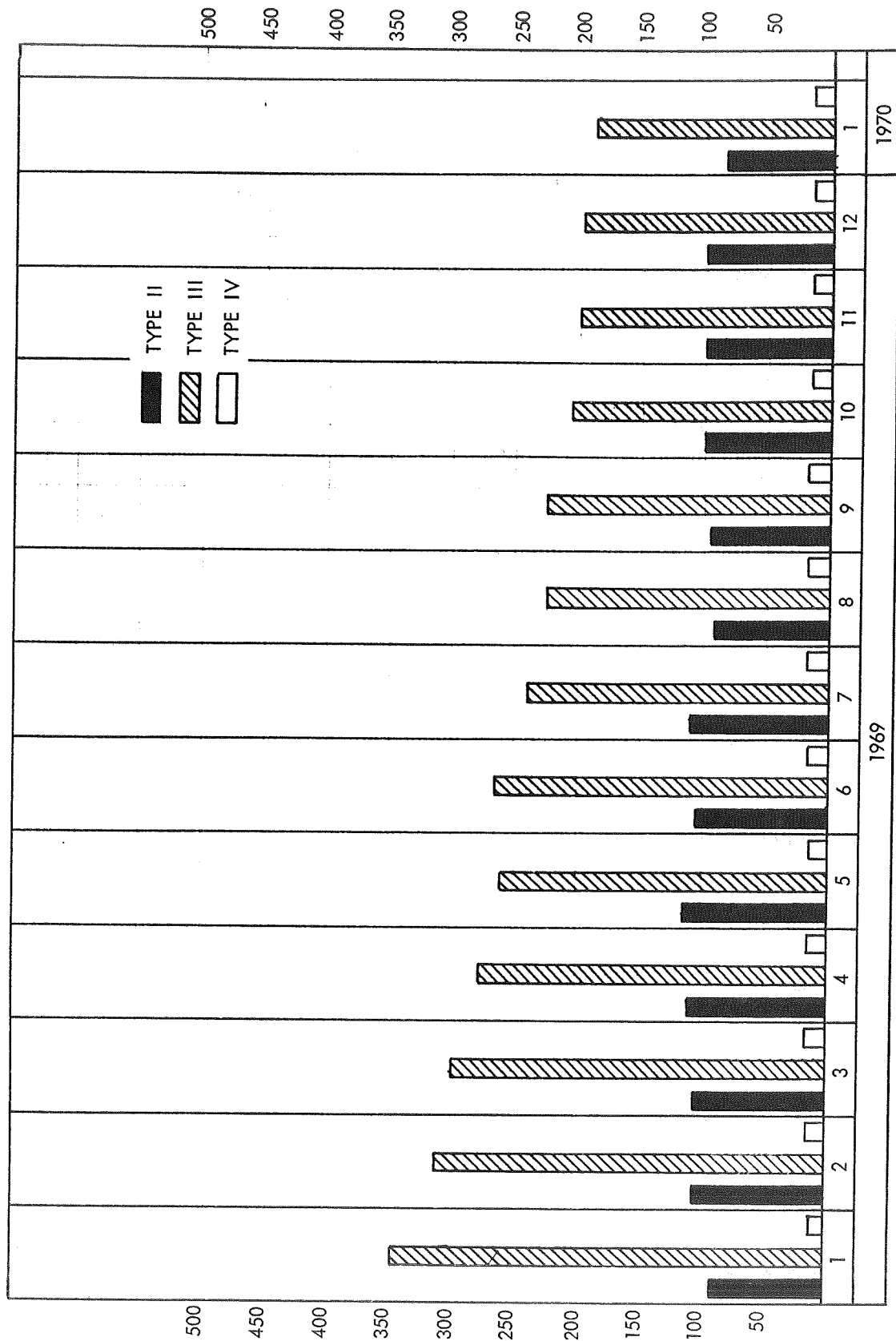


Figure 5-4. Current Awareness Searches by Type per Search Period

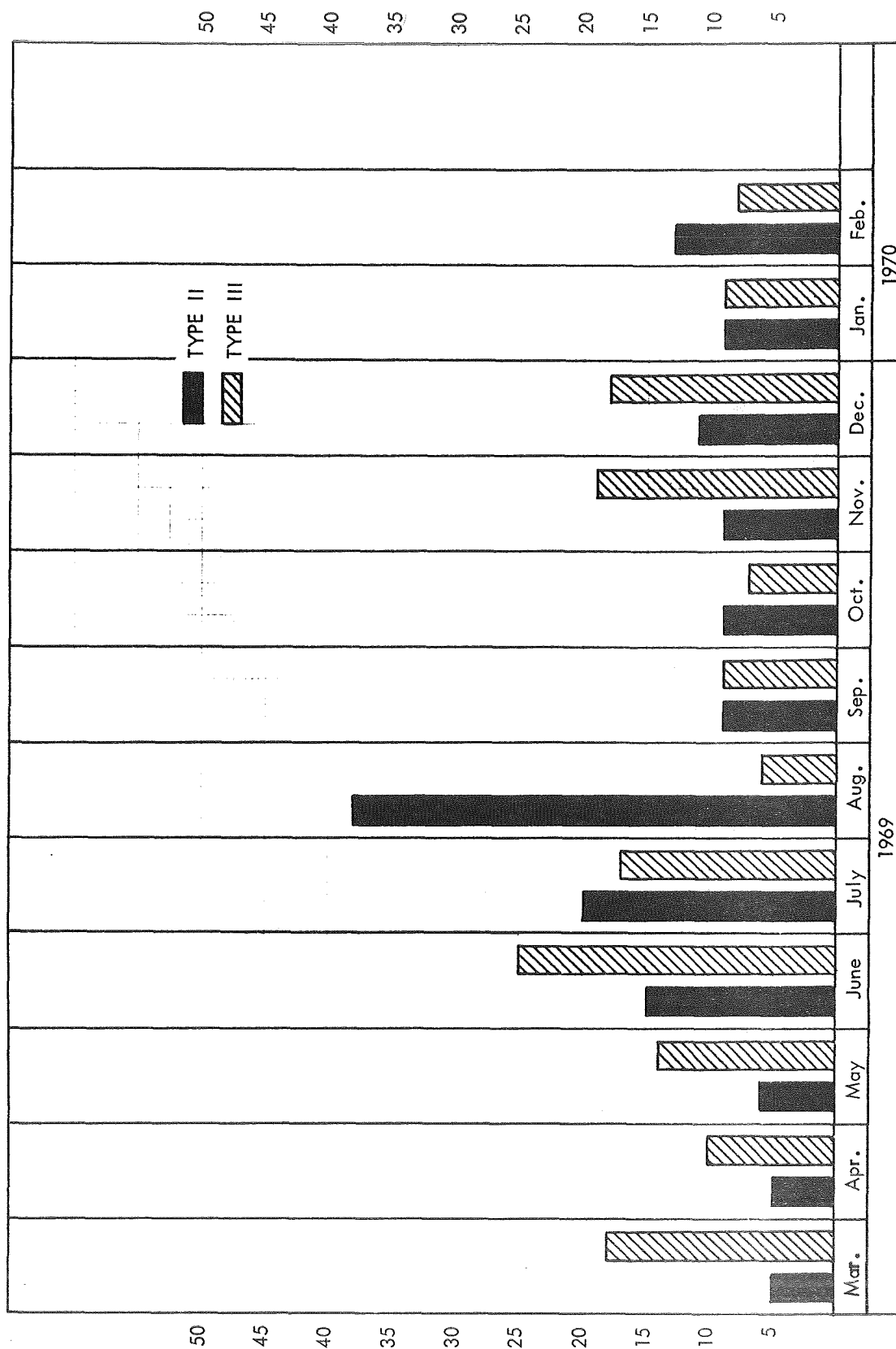


Figure 5-5. Retrospective Searches by Type by Month

retrospective profiles, respectively.

'No Citation' Searches

The total of 4,311 C/A searches performed on the NASA file during the reporting period included 481 searches which resulted in 'no citations,' i.e., no citations were identified by the computer or, if there were, none were deemed relevant to the client's inquiry. Thus, 'no citations,' in effect, means no relevant citations. The total of 481 (11%) reflects a 9% decrease since the last annual report. All 'no citation' results were associated with C/A searches only. All retros had some degree of positive response.

Figure 5-6 illustrates the 'no citation' results on a service period basis.

Citations Retrieved

The 4,620 current awareness and retrospective searches performed on the NASA file for the 590 unique profiles serviced during the reporting period resulted in the retrieval of 135,197 citations.

● Current Awareness	103,176
● Retrospective	<u>32,021</u>
TOTAL	135,197

Comparing these results with those of last year, a decrease of 34% in unique profile load, coupled with a decrease of 28% in searches per-

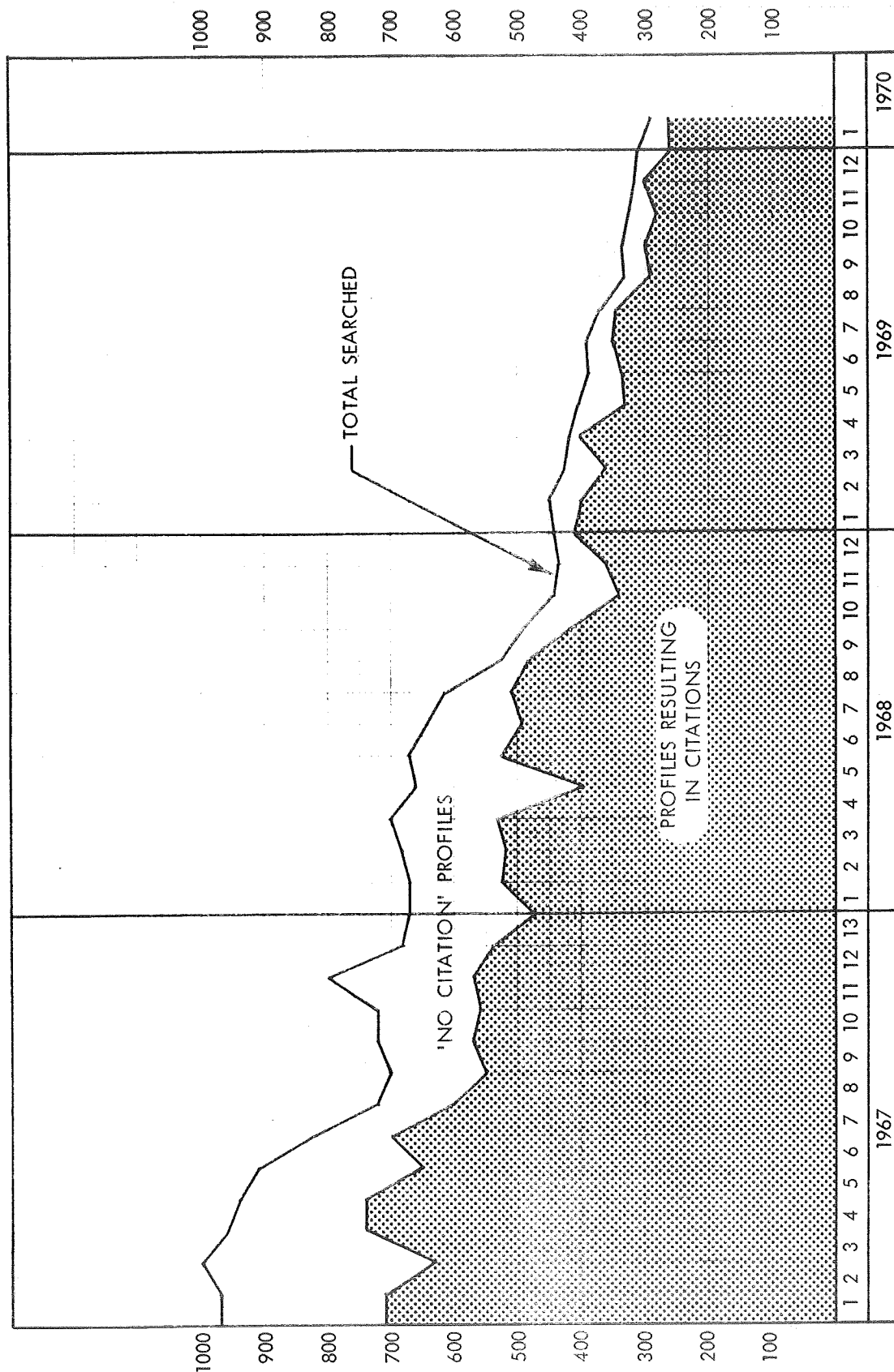


Figure 5-6. Current Awareness Profiles Resulting in No Citations by Search Period

formed, resulted in a 43% decrease in citations retrieved.

The 135,197 citations consisted of items announced in:

- Scientific and Aerospace Technical Reports (STAR)
- International Aerospace Abstracts (IAA)
- Aerospace Medicine and Biology (AM)
- NASA Tech Briefs
- Nuclear Science Abstracts (NSA)
- U.S. Government Research and Development Reports (USGRDR)

The majority of the retrieved items appeared in STAR and IAA and were retrieved mechanically. When a mechanical search is unsuccessful, a manual search of the above bulletins is often performed. The index terms of relevant items identified manually are reviewed and compared with the terms used in the computer strategy. Strategy revisions are made as required.

In order to facilitate the 'comparison,' a computer listing is printed out of all the accessions appearing on the monthly NASA tapes. Our information specialists regard this listing as an excellent reference and analysis tool.

During the preceeding reporting period Tech Briefs were to be listed on two NASA monthly tapes during the year. In that time, Tech Briefs published in the first six months of 1968 made their first appearance on the eleventh tape of the year. However, those published during the last six months of 1968 did not appear until the third tape of the current reporting period. No Tech Brief published in 1969 appeared on a tape

received during the current reporting period.

Under the circumstances, Tech Brief retrospective searches are performed mechanically, and current awareness searches are performed manually. Manual searches utilize a typed listing of Tech Briefs titles received monthly. This list is circulated among the analysts who screen it for items relevant to profiles assigned to them.

AM entries appeared on the monthly NASA tapes through the eighth tape of 1969 after which they were absorbed into the IAA entries. This is a much preferred arrangement because the abstract journal seldom, if ever, arrives in time to be used in conjunction with the current NASA tape. Thus, like the Tech Briefs, AM retrospectives were more readily implemented mechanically and current awareness searches, manually.

Other item types are cited only in current awareness searches and are identified through manual searches of the subject index of the bulletin announcing the item. The search of these bulletins in relation to a profile is not a scheduled effort as part of the services offered by the KAS Center to its clientele. It occurs when the subject area of a profile appears to be appropriate for the aerospace literature, but for which mechanical searches have been relatively unsuccessful. The overlap between the report literature accessioned for NASA's system and reports announced in other Government agencies' bulletins is sufficient to sometimes enable KASC to identify a document through these other bulletins that it was not able to locate in mechanical or manual searches

of STAR or IAA. As expected, the quantity of items cited from these sources is a very small proportion of the total and their quantities have been included with citations from AM.

Table 5-6 illustrates the quantities of all items from the NASA file cited in current awareness searches by source, service type and mode of citation during the reporting period.

Table 5-6. Current Awareness Citations

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type II</u>			
IAA	10,826	25	10,851
STAR	9,983	22	10,005
TECH BRIEFS	281	14	295
AM & OTHER	126	2	128
			ST 21,279
<u>Type III</u>			
IAA	46,182	413	46,595
STAR	43,921	388	44,309
TECH BRIEFS	1,231	162	1,393
AM & OTHER	814	128	942
			ST 93,239
<u>Type IV</u>			
IAA	4,861	43	4,904
STAR	4,645	55	4,700
TECH BRIEFS	133	21	154
AM & OTHER	179	0	179
			ST 9,937
TOTALS	101,966	1,210	103,176

Similarly, for retrospective searches of the NASA file, the distribution of the items cited is given in Table 5-7.

Table 5-7. Retrospective Citations

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type I</u>			
IAA	1,416	0	1,416
STAR	2,789	0	2,789
TECH BRIEFS	0	0	0
AM & OTHER	50	0	59
			ST 4,264
<u>Type II</u>			
IAA	7,656	7	7,663
STAR	12,138	14	12,152
TECH BRIEFS	32	26	58
AM & OTHER	239	0	239
			ST 20,112
<u>Type III</u>			
IAA	12,868	40	12,908
STAR	18,336	44	18,380
TECH BRIEFS	51	19	70
AM & OTHER	659	4	663
			ST 32,021
TOTALS	51,979	754	52,133

Citations Forwarded

A total of 79,148 citations from the NASA file were forwarded to KASC clients during the reporting period. This represents 38.5% of all citations retrieved, both manually and mechanically, for the citations forwarded during the year. The reader should not overlook the fact that our Type II service does not have any 'post-computer search' review. Thus, all computer output--noise included--is submitted to the client.

Of the total 205,491 citations identified by these searches, 126,343 citations (61.5%) were identified as noise by subject specialist review. This degree of noise is even greater when computer on the basis of citations retrieved for profiles requiring subject specialist review. Thus, 120,404 rejects out of a total 152,931 indicates 78.7% of search output for Type III service was noise.

The above statistics indicate the value of the subject specialist review (positive thinking). The client receives both the benefit of an aerospace literature search more thorough than he personally has time to perform, and the benefit of an elimination process which he would have to perform to overcome the inadequancies that presently exist in the state-of-the-art of information retrieval systems such as ours.

Type IV (Standard Interest Profile) citations contained 5,939 items considered noise by subject specialist review. This represents 53.2% of the total 11,169 retrieved. Please note that SIP's are broader in scope than the normal profiles we service because they are slanted toward groups of users rather than at individuals.

The quantities of all NASA file citations resulting from current awareness service and forwarded to clients are identified in Table 5-8 by source, service type and mode of citations.

Similar statistics for retrospective searches are presented in Table 5-9.

Table 5-8. Current Awareness Citations
Forwarded to Clients

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type II</u>			
IAA	10,826	25	10,851
STAR	9,983	22	10,005
TECH BRIEFS	281	14	295
AM & OTHER	126	2	128
			ST 21,279
<u>Type III</u>			
IAA	13,618	370	13,988
STAR	11,317	315	11,532
TECH BRIEFS	418	155	573
AM & OTHER	95	95	190
			ST 26,383
<u>Type IV</u>			
IAA	2,771	42	2,785
STAR	2,067	23	2,090
TECH BRIEFS	277	36	313
AM & OTHER	42	0	42
			ST 5,230
TOTALS	51,821	1,213	52,892

Table 5-9. Retrospective Citations
Forwarded to Clients

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type II</u>			
IAA	7,656	7	7,663
STAR	12,138	14	12,152
TECH BRIEFS	32	26	58
AM & OTHER	239	0	239
			ST 20,112
<u>Type III</u>			
IAA	2,932	43	2,975
STAR	2,989	55	3,044
TECH BRIEFS	23	11	34
AM & OTHERS	87	4	91
			ST 6,144
TOTALS	26,096	160	26,256

Figure 5-7 presents, on a search period basis, for the Type III current awareness profiles served, a comparison of the total citations retrieved with the total citations forwarded.

During the current year the packaging of the NASA file citations forwarded to clients was changed. For the first six months the packaged citations had consisted of abstracts of cited items reproduced on 3 x 7.5 inches slips of paper stapled as a small booklet to an evaluation-document-order form. This package was considered not to connote the unique effort expended in response to a client's interests and, without supporting covers, the booklet did not lend itself well to storage by the client.

Beginning with the third quarter of the reporting period, the end product of a search performed by the KASC now consists of a booklet, approximately 8½ by 10 inches in size, bound with a cover of the same design with which this report is bound. In the title block of the cover appears the following:

- An identification number assigned to the profile for which the search was performed.
- The title of the profile.
- The name of the individual for whom the search was performed.
- The individual's organizational affiliation.
- An identification number assigned to the organization.

The preliminary pages of the booklet consist of a title page (name of the individual, his organization, and profile title) and an introductory

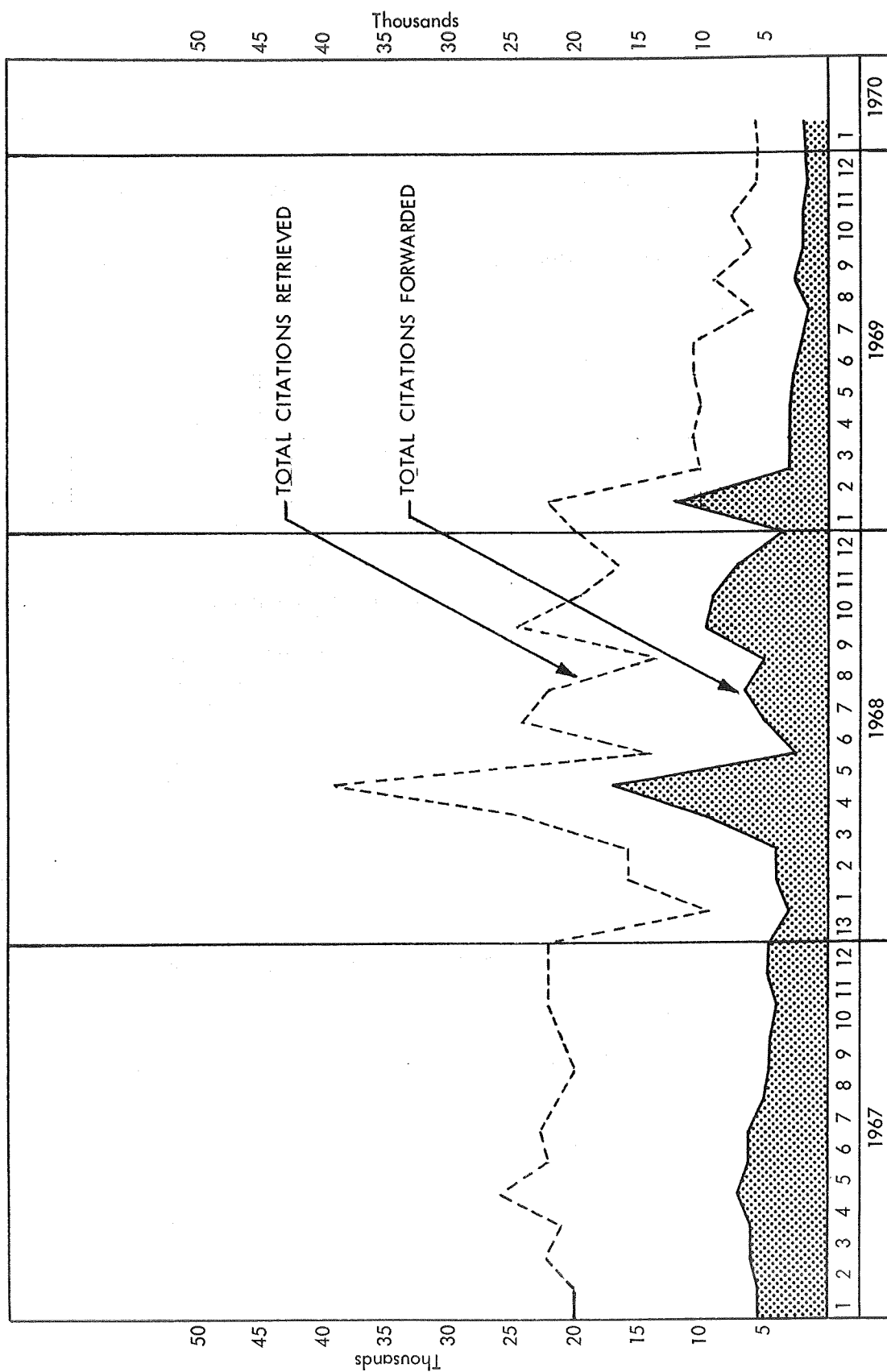


Figure 5-7. Type III Current Awareness Citations Retrieved vs. Citations Forwarded

page providing the following:

- Identification of the NASA computer tape which was searched.
- Identification of the STAR and IAA issues announcing the documents covered by the computer tape.
- An explanation of the KASC Service Type which was provided for the search.
- The name of the KASC subject specialist (for Type III Service) responsible for the identification of abstracts of documents, produced as a result of the search, which are of direct interest to the individual submitting the profile.

The main part of the booklet consists of the abstracts of documents cited by the search. The abstracts are reproduced three to a page and appear in sequence of their accession numbers. In the case of Type III service, however, the sequence is interrupted by moving to the front all pages containing one or more abstracts identified and appropriately marked by a KASC subject specialist as being of direct interest to the client. When a Type III Search results in no abstracts of direct interest as determined by the subject specialist, a third preliminary page is added to the booklet explaining the absence of marked abstracts.

Clients of the KASC search services have favorably received the new format of the search results package. Its appearance and the ease with which it can be stored and handled have been its most often remarked merits.

With the new package, recipients of Type III service now receive abstracts of all items cited by the computer search rather than just those which are of direct interest to the profile. As mentioned, however, those abstracts which are related to the profile have been appropriately

marked by the KASC subject specialist responsible for the profile and the pages containing the related abstracts are moved to the front of the booklet for the convenience of the client. Rather than a detriment to Type III service, the additional abstracts have enhanced the value of the service by providing information of peripheral interest and by serving as a mechanism for client review of the responsible subject specialist's concept of the scope of the profile.

Although all abstracts cited by a Type III search are now forwarded to the client, any statistical data descriptive of the search is recorded as though only those which are related to the profile had been forwarded.

Document Service

Document service for the NASA file is provided to KASC clients as a separate service. The KASC is able to provide hard copy and, for the majority of the NASA file, microfiche copy of nearly every document in the file. Fees for hard copy are based on a per page count while a single rate exists for microfiche copy.

The documents constituting the NASA file are announced in the two bulletins STAR and IAA in which they are identified by accession numbers preceeded by the alphabetics "N" and "A," respectively. For this reason, they are commonly referred to as N-documents and A-documents.

Most of the N-documents are available in microfiche form and are provided to KASC by NASA. Hard copies of these documents are provided to KASC

clientele through the enlargement-exposure-development processes of a microfilm reader/printer. Through January 15, 1970, of the current reporting period, the KASC used its ITEK 18-24RS for this purpose. The documents on microfiche are exposed and printed two frames at a time, resulting in a page size which permits us to provide full document service at low cost. After January 15, 1970, the KASC has taken advantage of an experimental effort of the NASA Regional Dissemination Center Network and obtained hard copy produced from microfiche from the Aerospace Research Applications Center (ARAC) of Indiana University. At that facility, a Xerox Reader/Printer is utilized to expose and print the documents one frame at a time at comparable cost.

Requests for microfiche copies of N-documents are filled by the KASC using its microfiche duplication equipment. This equipment is also used for reproduction of microfiche copies of A-documents as requests are received. Unlike the N-documents, microfiche for the A-documents are not supplied to the KASC by NASA but must be purchased from the AIAA. While approximately 50% of the A-documents are available on microfiche, the KASC does not automatically purchase all microfiche available because the frequency of duplicate requests by KASC clients for the same item is less than two.

Hard copies of A-documents are provided to the KASC clientele from several sources. The interlibrary loan services of the AIAA and the libraries of the University of Pittsburgh are relied upon for nearly all documents which are not available on microfiche. Failing these sources, the document

is purchased from its publisher. Hard copy of A-documents which are available on microfiche is supplied in a manner identical to that for N-document hard copy. Through January 15, 1970, the microfiche copy was purchased from the AIAA and a print of the document was produced on the KASC reader/printer. After January 15, 1970, the hard copy was obtained from ARAC.

The total documents requested during the reporting period were tallied by the type of search service which had been provided. The results are illustrated in Table 5-10.

The documents supplied during the same period by month and document type is illustrated in Figure 5-8 and the distribution of the total documents supplied among STAR subject categories is provided in Table 5-11.

Related Activities

Materials Engineering

During 1968, Materials Engineering magazine joined the clientele of KASC for a purpose distinct from the remainder of the group. Profiles phrased by the magazine were directed toward the interest areas of its subscribers and required only retrospective search service. From the results for each profile provided by KASC, the magazine selected the abstracts of documents directly related to its readers' interests and

Table 5-10. Documents Requested Per Service Type.

SERVICE TYPE	A-DOCUMENTS		N-DOCUMENTS		TOTALS
	HC	MF	HC	MF	
<u>Type I</u>					
C/A	0	0	0	0	0
Retro	0	0	0	0	0
					ST* 0
<u>Type II</u>					
C/A	507	130	361	125	1173
Retro	40	1	52	3	96
					ST 1269
<u>Type III</u>					
C/A	1587	441	1190	311	3529
Retro	169	44	141	59	413
					ST 3942
<u>Type IV</u>					
C/A	51	0	53	11	115
Retro	0	0	0	0	0
					ST 115
<u>Uniden- tified</u>					
C/A	203	12	313	14	542
Retro	0	0	0	0	0
					ST 542
TOTALS	2607	628	2110	523	5868

announced each month the topic of the 'packet' of abstracts, the quantity of abstracts in the packet, and the packet's availability through the Materials Engineering reader services. Responses received by the magazine were forwarded to KASC, which then supplied the reader with a copy of the abstract packet. During 1969, summary announcements of the packets by Materials Engineering resulted in a continuation of requests for the packets. A total of 3441 copies of 34 packets were supplied during the year, representing a total of approximately 78,183 citations.

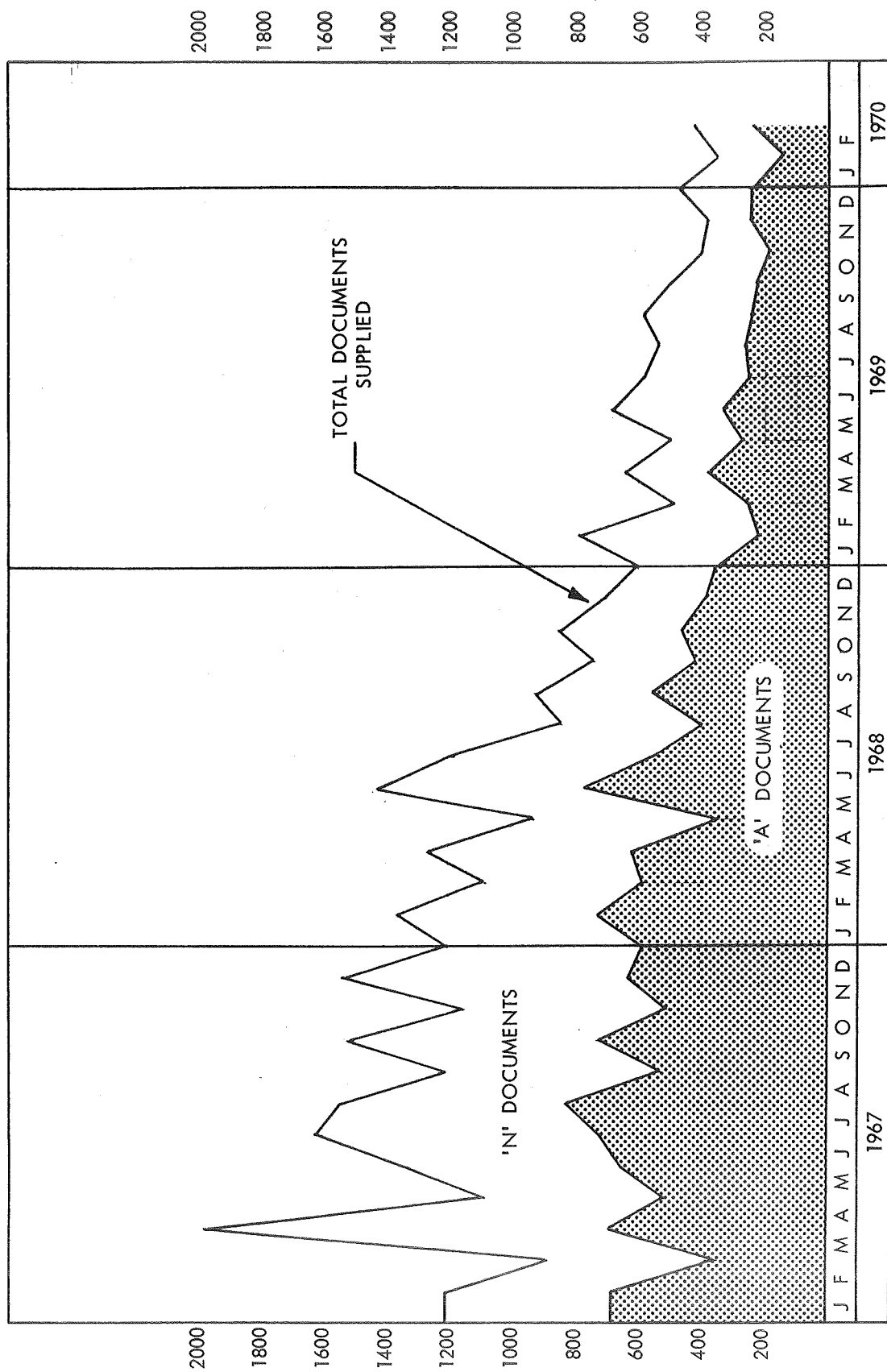


Figure 5-8. Documents Supplied per Month

Table 5-11. Documents by STAR Category

STAR CATEGORY NUMBER	STAR CATEGORY TITLE	STAR		IAA		TOTALS
		HC	MF	HC	MF	
01	Aerodynamics	9	10	33	9	61
02	Aircraft	36	9	30	10	81
03	Auxiliary Systems	92	17	101	3	213
04	Biosciences	55	6	15	5	81
05	Biotechnology	50	8	70	7	135
06	Chemistry	164	40	28	2	234
07	Communications	26	7	16	7	56
08	Computers	101	49	47	9	206
09	Electronic Equipment	83	9	81	3	176
10	Electronics	23	5	11	1	40
11	Facilities, Research & Support	10	2	35	5	52
12	Fluid Mechanics	37	31	45	12	125
13	Geophysics	15	10	9	7	41
14	Instrumentation & Photography	72	61	180	65	378
15	Machine Elements & Processes	345	111	612	69	1137
16	Masers	34	10	81	5	130
17	Materials, Metallic	376	76	444	37	933
18	Materials, Non-metallic	212	82	262	25	581
19	Mathematics	102	21	8	1	132
20	Meteorology	33	3	9	2	47
21	Navigation	2	4	8	4	18
22	Nuclear Engineering	28	10	3	0	41
23	Physics, General	47	26	23	1	97
24	Physics, Atomic, Mol., Nuclear	26	3	2	1	32
25	Physics, Plasma	9	5	18	0	32
26	Physics, Solid-State	60	10	121	3	194
27	Propellants	10	1	15	3	29
28	Propulsion Systems	7	8	28	7	50
29	Space Radiation	4	1	5	1	11
30	Space Sciences	6	7	19	2	34
31	Space Vehicles	50	1	9	1	61
32	Structural Mechanics	110	22	197	24	353
33	Thermodynamics & Combustion	40	12	32	15	99
34	General	49	43	87	15	194
TOTALS		2319	720	2684	541	6084

Functional and Cost Analysis Effort

During the reporting period computer programs were developed to minimize the clerical effort of generating statistical data for analysis and reporting purposes. Two categories of data are covered by these programs: quantities of items cited by searches and items forwarded to KASC clients and quantities of documents supplied to KASC clients. A total of four programs are required; a diagnostic program for each of the data categories and a summarization and analysis program for each of the data categories. Similar programs for a third category of data, clientele evaluation of searches, will be developed during the coming year.

A functional and cost analysis effort for the search service of the KASC was undertaken during the reporting period with the accomplishment of the following:

- Completion of surveys to identify activities of profile processing.
- Categorization of the above activities.
- Quantification of the time per profile spent in each activity category.
- Quantification per profile of fixed costs, e.g. computer costs, copying machine costs, etc.
- Construction of a computer program for analysis of the above data.
- Execution of the program for preliminary results pending the final determination of operational overhead per profile.

The first four steps built upon work performed in the two previous years during which the activities and their associated costs fluctuated in relation to emerging subsystems. The subsystems correspond with the array

of service type and search types offered by the KASC and an algorithm for computer analysis of the collected data must incorporate this factor. The algorithm for determining costs per profile which was used is as follows:

$$(\text{FIXED COSTS PER SERVICE-SEARCH TYPE})$$
$$+$$
$$(\text{OVERHEAD COSTS PER SERVICE-SEARCH TYPE}) / N$$

where N is the number of profiles per service-search type for a specified time period.

The "Fixed Costs per Service-Search Type" includes both professional and clerical labor costs involved with processing the search strategy and output from the computer search. The results from the operations research surveys have been used to compute average costs for use in this area.

The "Overhead Costs per Service-Search Type" accounts for the costs due to management, supervision, marketing, and equipment rentals. Each service is assigned a certain percentage of these costs and its share is amortized across the total number of profiles of the service type in order to arrive at a cost per profile figure.

The "Fixed" and "Overhead" costs are computed for a twelve month period for the current awareness services and a one month period for the retrospective services.

In the absence of a demand for Type I service, no costs were computed for

this service-search type. This left Type II and Type III services for which two sets of costs each were computed, one for C/A service and one for Retro service. The computer program as developed does not take into account a mix of service-search types but does provide for each individual service-search type the loss or profit which occurs from a specified number of profiles receiving service. Applications of a mixture of service-search types must be performed external to the computer program.

During the coming year, modifications of the algorithm and computer program are anticipated which will enable the KASC to identify the budgetary requirements for cost-recovery operations at a total known profile load.

VI. EVALUATION OF THE RDC

Elizabeth P. Hartner

Guy W. McGee

CUSTOMER EVALUATION OF SEARCH RESULTS

When search results are mailed out, an evaluation form is included in the packet. On this form are listed all the accession numbers of the abstracts being transmitted. The client is requested to evaluate each item and to return the form to KASC using an enclosed self-addressed envelope. Three possible choices of evaluation are possible:

- o Abstract is related to the profile.
- o Abstract is not related to the profile.
- o Abstract is not related to the profile but is related to other interests of mine--please continue sending this type of information.

In addition to acting as a 'feedback' mechanism, the form used during this reporting period also served as a document order form. A client may order a full document in either hard copy or microfiche. Where the client does not evaluate a citation but does request that it be sent to him in 'full copy,' KASC considers the citation as relevant to that profile.

During the reporting period, KASC performed 4,620 searches of the NASA file and submitted to clients the results of 4,188 searches (585 searches resulted in "no citations"). At the same time evaluations were received from KASC clients for 3,046 searches. Obviously, the client evaluations received in any one month (search period) are not related to the search results submitted in that same period. In fact, the evaluations may be of results submitted many months earlier. Nevertheless, a plot of the evaluations received by month results in a curve similar to that

derived from a plot of the searches submitted by month. This similarity is presented in Figure 6-1. Ignoring the absence of a direct relationship between searches submitted and evaluations received, it may be stated that during the twelve month period the KASC clients evaluated 73% of the 4,188 possible searches.

The 3,046 searches evaluated by KASC clients consisted of 2,956 current awareness searches and 90 retrospective searches distributed among the service types as follows:

<u>Service Type</u>	<u>C/A Searches</u>	<u>Retro Searches</u>
Type II	928	16
Type III	1947	74
Type IV	<u>81</u>	<u>0</u>
TOTALS	2956	90

A total of 47,036 citations were evaluated by the returned evaluations. Tables 6-1 and 6-2 present the quantities of evaluated citations for C/A and retro searches, respectively, and presents the distribution of these items by type of service and source of origin.

For search results of all Type III profiles evaluated by KASC clients during the reporting year, the percentage of items forwarded to the responding clients which had been rated pertinent was calculated for each chronological month. The results by month are presented in Table 6-3.

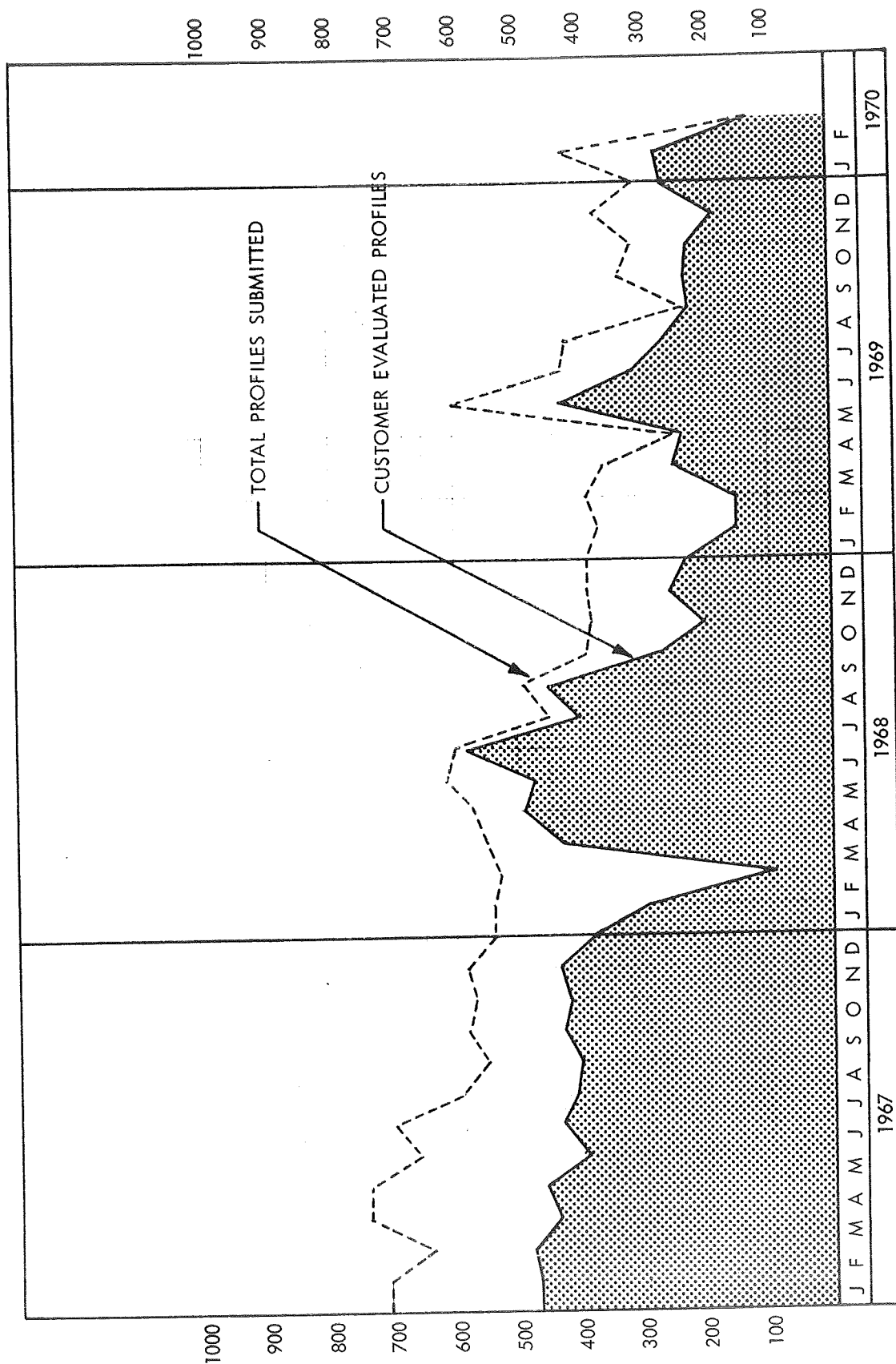


Figure 6-1. Customer Evaluated Profiles

Table 6-1. Customer Evaluation of Current Awareness Citations

SERVICE TYPE	RELEVANT	%	NON-RELEVANT	%	RELATED TO OTHER INTER	%	TOTALS	%
<u>Type II</u>								
IAA	5761	66	2541	29	423	5	8725	100
STAR	6201	68	2562	28	354	4	9117	100
TECH BRIEFS	109	57	64	34	18	9	191	100
AM & OTHER	48	44	59	55	1	1	108	100
Subtotals	12119	67	5226	29	796	4	18141	100
<u>Type III</u>								
IAA	9045	80	1396	12	839	8	11280	100
STAR	7437	77	1390	15	801	8	9628	100
TECH BRIEFS	227	82	28	10	23	8	278	100
AM & OTHER	64	66	21	22	12	12	97	100
Subtotals	16773	79	2835	13	1675	8	21283	100
<u>Type IV</u>								
IAA	297	45	272	42	81	12	650	100
STAR	285	49	228	39	67	12	580	100
TECH BRIEFS	22	61	13	36	1	3	36	100
AM & OTHER	2	14	7	50	5	36	14	--
Subtotals	606	47	520	41	154	12	1280	100
TOTALS	29498	73	8581	21	2625	6	40704	100

Table 6-2. Customer Evaluation of Retrospective Citations

SERVICE TYPE	RELEVANT	%	NON-RELEVANT	%	RELATED TO OTHER INTER	%	TOTALS	%
<u>Type I</u>								
IAA	6	100	0	--	0	--	6	100
STAR	2	100	0	--	0	--	2	100
TECH BRIEFS	0	--	0	--	0	--	0	--
AM & OTHER	0	--	0	--	0	--	0	--
Subtotals	8	100	0	--	0	--	8	100
<u>Type II</u>								
IAA	171	25	503	74	5	7	679	100
STAR	248	32	520	67	7	1	775	100
TECH BRIEFS	0	--	0	--	0	--	0	--
AM & OTHER	0	--	10	100	0	--	10	100
Subtotals	419	29	1033	70	12	1	1464	100
<u>Type III</u>								
IAA	1510	64	451	19	409	17	2370	100
STAR	1247	52	643	27	499	21	2389	100
TECH BRIEFS	18	44	16	39	7	17	41	100
AM & OTHER	55	92	5	8	0	--	60	100
Subtotals	2830	58	1115	23	915	19	4860	100
TOTALS	3257	51	2148	34	927	15	6332	100

Table 6-3. Per Cent of Type III Service Items Rated Pertinent.

MONTH OF RETURN	CURRENT AWARENESS	RETROSPECTIVE
Mar, 1968	79	48
Apr	75	47
May	78	46
Jun	70	58
Jul	75	64
Aug	73	59
Sep	67	64
Oct	71	75
Nov	76	100
Dec	69	67
Jan, 1970	93	65
Feb	92	53

The sudden, high percentages for the months of January and February, 1970, prompted a comparison of similar figures for these months for Type II service. A similar phenomenon also occurred for that service as illustrated in Table 6-4.

Table 6-4. Per Cent of Items Rated Pertinent for Type II and Type III Services.

MONTH	Type III	Type II
Dec	69	64
Jan	93	76
Feb	92	73

The factor affecting Type III service also affected Type II service. While these factors can not be definitively identified, it is probable that one or all of the following contributed to this sudden rise in pertinency:

- The decreased profile load has resulted in a set of successful profiles. Clients' have tended to cancel service for profiles which result in a high rate of non-pertinent items.
- During the year, the Technical Analysis staff consisted entirely of experienced personnel capable of constructing successful strategies for newly introduced profiles.
- Strategies for profiles whose service continued from previous years were improved.
- Items accessioned by NASA for its document file appear to include an increasingly larger portion which are of interest to industrial companies.

As a result of the repackaging of the search results which are forwarded to a client, mentioned in Section V under Technical Operations, clients now receive all abstracts cited by a computer search. Previously, for this service type, only those abstracts which the responsible subject specialist considered to be of direct interest were forwarded to the client. A recipient of Type III service is now able to evaluate the effect of the subject specialist and compare the specialist's concept of the profile's scope with his own. Through the evaluation feedback mechanism the client may inform the KASC of discrepancies which occur.

Several clients are beginning to take advantage of this opportunity. During the months of January and February, 1970, recipients of Type III service for nine profiles returned evaluation forms identifying 27 items as being relevant to their interests which had not been selected by the responsible subject specialists for their immediate attention. The subject specialists had indicated a total of 159 items as being pertinent to the profile, 132 of which the clients accepted. The client agreement

and his quantity of added items is shown on a per profile basis in Table 6-5. Out of the total 2,914 client-evaluated items for Type III service during the two month period, the 27 items which our specialists failed to select for the client represents only about one per cent.

Table 6-5. Client/Subject Specialist Comparison of Relevancy

Profile	Items Forwarded as Pertinent	Items Client in Agreement	Client Added Items
1	9	1	3
2	1	1	1
3	12	9	4
4	13	10	5
5	23	14	9
6	5	5	1
7	4	4	1
8	62	62	2
9	30	26	1
TOTAL	159	132	27

IMPACT STUDIES

Impact studies continued utilizing the algorithm:*

$$I = Q + P + C + R$$

where I is a quantity representing impact,

Q is a quantity derived from document questionnaire answers,

P is a quantity derived from evaluation data returned from the client,

C is a quantity derived from customer reports,

and R is a factor based upon company contract renewal.

Q Value

The information transmitted by this information retrieval center is in the documents ordered by the user. A document oriented questionnaire was therefore developed* to identify the value of the ultimate information. During the year 1969-70 the document questionnaire was modified twice. In the first revision, Figure 6-2, the number of questions was reduced from 20 to 16. The format of the new questionnaire eliminated division into documents of direct value and those of indirect value, but the nature of the questions remained essentially the same. Figure 6-3 shows the original questionnaire as used in the previous contract year. The second change made to the questionnaire was a provision for

* Fifth Annual Report - The Space & Technology Transfer Program
at the University of Pittsburgh, June 1969.

Document Number _____ Company Code _____ Question Number _____
TO: Document Requester

After using the information in the attached document, please fill out and return this questionnaire in the enclosed envelope. Your answers will assist us in improving our service to you and in preparing management reports.

1. May we reveal that this document was of interest to your company? If the answer is "No", we will use the answers to the following questions in a statistical summary relating document source, subject area, etc. to value criteria with no reference to the name of the company which evaluated it.

YES ☐ NO ☐

Please grade your replies from 1 to 9 using the appropriate spaces, with 1 indicating none or the smallest extent and 9 the greatest extent.

2. After you examined the document to what extent did you consider it of use to you? If of no use, you need only answer question 15 and 16
3. To what extent did specific data such as temperature, properties, rates or test results make the document useful to you or did it link variables together in an applicable way?
4. How useful was the described mechanism, process, material or technique to you?
5. To what extent was testing or experimentation modified because of this information?
6. To what extent did the information assist in performing research?
7. Did the information usefully add to your knowledge?

1 2 3 4 5 6 7 8 9

☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐

Was the information beneficial to your company in relation to the following:

8. To what extent did it reduce costs?
9. To what extent did it increase productivity?
10. To what degree did it improve product quality?
11. To what extent did it increase profits?
12. Estimate yearly savings \$
13. If none of the above apply, in what other way was the document of use? For example, "for reference file" _____, "for other research interests" _____, "for future use" _____ (Check if applicable)
14. Is it probable that you would miss this information if not for the NASA source?
15. Does there seem to be more information in the NASA literature on this subject than in other available sources? If "No", what other source is better?
16. Have you any suggestions or comments in regard to the service or the questionnaire? If so, you may write them on the back of this sheet.

☐☐☐☐☐☐☐☐☐
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☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐

YES ☐ NO ☐
YES ☐ NO ☐

Your signature _____ Date _____

Return to KAS Center, LIS Building, 135 N. Bellefield Avenue, Pittsburgh, Pennsylvania 15213
Attention: Mrs. E. P. Hartner

Document No. _____

Company Code _____

Question No. _____

TO: DOCUMENT REQUESTOR

Answers to the questions listed below will supply evidence as to the usefulness of the National Aeronautics and Space Administration information retrieval and dissemination effort. When you have completed your examination of the document, you will help us if you will answer these questions and return the questionnaire in the accompanying envelope. It is not necessary to answer every question, but only those you feel apply to the document.

1. May we reveal that this document was of interest to your company? Yes _____ No _____
If the answer is "No" we will use the answers to the following questions in a statistical summary relating document source, subject area, etc. to value criteria, with no reference to the company which evaluated it.
2. After you received the document and examined it did you consider it of value to you? Yes _____ No _____
If "Yes", answer the following questions. If "No", no further answers are needed.
3. Was the information in the document a direct answer to your needs? Yes _____ No _____
 - a. Specific data, such as temperature, properties, or rates, make the document useful to us. Yes _____ No _____
 - b. A useful mechanism, process, material, or technique is described. Yes _____ No _____
 - c. Will testing or experimentation previously proposed by you now be unnecessary because of the information obtained? Yes _____ No _____
 - d. If answers a, b, and c are "No", will you indicate in what way the document was directly of use? Yes _____ No _____
If "Yes", indicate here.
4. Was this information indirectly of use? Yes _____ No _____
 - a. Will testing or experimentation previously proposed by you now be unnecessary because of the information obtained? Yes _____ No _____
 - b. Did the information assist in performing research? Yes _____ No _____
 - c. Did the information help to improve a process? Yes _____ No _____
 - d. Did the information help to improve equipment? Yes _____ No _____
 - e. Did the information usefully add to your knowledge? Yes _____ No _____
 - f. If none of the above is applicable would you indicate in what way the document is indirectly of use? For example: "for reference file."
5. Will this information be beneficial to your company in relation to any of the following:
 - a. Costs Yes _____ No _____
 - b. Productivity (quantity/time) Yes _____ No _____
 - c. Product (quality) Yes _____ No _____
 - d. Profit Yes _____ No _____
6. Is it probable you would miss this information were it not for the NASA source? Yes _____ No _____
7. Does there seem to be more information in the NASA literature on this subject than in other available sources? Yes _____ No _____
If "No", what source is better?
8. Have you any suggestions or comments in regard to the service (or the questionnaire?)

Figure 6-3. Document
Questionnaire, Original
Version

Return to: KNOWLEDGE AVAILABILITY SYSTEMS CENTER
HOTEL WEBSTER HALL
UNIVERSITY OF PITTSBURGH
PITTSBURGH, PENNSYLVANIA 15213

ATT: GUY McGEE

grading the answer, from 1 to 9, with 1 indicating no value and 9 the most value. The change was made to better enable clients to answer questions hard to answer by direct yes or no. The typography was also improved to make the questionnaire easier to read.

The change in the questionnaire did not result in an increase in the number of returns which had decreased from an original good response. A business reply card was then designed to simplify, and therefore encourage, the return of the questionnaires, Figure 6-4. The number of questions was reduced to 7, of which 6 were to be graded from 0 to 9 for ease in answering. The questions themselves were cut down to the bare essentials needed to indicate that a document was of potential value. The actual identification of technology transfer should result from following up cards which indicated above average value for any of the questions. Between December 19, 1969 and February 28, 1970, 503 of these cards were sent out with requested documents. Of these 128 or 25.4% have been returned to date. Twenty-seven of these returns indicate documents of potential valuable technology transfer. Ten of the 27 are N documents, 17 are A documents. The twenty-seven returns indicating potential valuable technology transfer were from five of the 12 companies which returned questionnaires. Another group of about 500 questionnaire cards will be sent out during the next quarter. An effort will be made to channel these questionnaire cards to companies not previously covered.

Valuable N documents, both from the last set resulting from the return-

May we reveal that this document was of interest
to your company? Yes ☐ No ☐
If the answer is "no" answers will be used in a
statistical summary, without subject identification.

Document No. _____
Company Code _____
Question No. _____

Please grade your answers from 0 to 9 with 9 the most value and 0 for least.

1. To what extent do you consider this document
of use to you?
2. To what extent did the information AID IN RESEARCH? .
3. To what extent did it REDUCE COSTS?
4. To what extent did it INCREASE PRODUCTIVITY?
5. To what extent did it IMPROVE PRODUCT QUALITY? . .
6. To what extent did it INCREASE PROFITS?

0	1	2	3	4	5	6	7	8	9

Your signature _____

Date _____

Figure 6-4. Document
Questionnaire, Second
Revision

able card, and also returns from previous questionnaires were utilized for the first trial follow-up interviews to uncover evidences of technology transfer. All of the interviews so far conducted have been by telephone. On the basis of the amount of effort, professional time, and the results for this follow-up, a coordinating effort utilizing engineering staff members will be initiated during the coming quarter. Fifteen results of follow-up interviews are listed in Appendix B.

P Value

The P of the impact algorithm is equivalent to:

$$\frac{\text{the number of reviewed abstracts evaluated as pertinent}}{\text{total number of reviewed abstracts evaluated}} \times 10$$

which is 1/10 of the figure reported in Table 6-3 for precision. This represents a simplification of the value of P as it was derived in the 5th Annual Report as follows:

$$P = \frac{10E}{S} \frac{A}{B} - \frac{N}{S}$$

Where A = number of abstracts submitted to client which he
evaluated as relevant to his interests

B = total number of abstracts evaluated

S = number of searches performed in time period

E = number of searches evaluated

N = number of searches resulting in 'no citation' reports

The reason for the simplification is that it seems pointless for a factor whose total value in the impact determination is only 1/10 of the total score.

C Value

The value of C was derived from contact reports. Each client contact is documented. When the report is made out, the reporter indicates on a 1-5 scale his opinion of customer satisfaction. The evaluation of each report is multiplied by 2 (because total value for C in the algorithm is 10) and the sum of all the reports is divided by the number of reports. The number of contacts made by technical specialists with the clients during the year are summarized in Table 6-6.

R Value

The renewal factor, R, has been calculated as the number of companies renewing during the quarter. To arrive at this relationship it is assumed that we have a base of 80 companies. To maintain the base therefore, we should have 20 renewals per quarter.

I Value

For an impact score of perfect, or 100,

$$Q = 60, P = 10, R = 20, C = 10,$$

in the algorithm

$$I = Q + P + C + R.$$

Impact values calculated for the system are summarized in Table 6-7.

Table 6-6. Customer Contacts

	Quarters				Total
	1st	2nd	3rd	4th	
Green Trigger*	32	40	12	19	103
Others	33	34	54	113	234
TOTAL	65	74	66	205	410

* Green Trigger: Contacts resulting from a green sticker put on the output to alert the reviewer to the need for a quarterly technical contact with the user.

Table 6-7. Impact Values for Current Awareness, Reviewed System

	Q	P	R	C	I
1st quarter	55	8	6	(8)*	77
2nd quarter	35	7	8	8	58
3rd quarter	30	8	9	8	55
4th quarter	35	8	7	8	58
Average	39	8	8	8	62

* These figures were not available, we therefore used the average for the other three quarters.

Each I is calculated in this simplified way. The average value "I" is a qualitative measure of the Center's effectiveness. By effectiveness we mean giving the user information of value to him. Table 6-7 shows that we are above what we consider a halfway mark between no good at all and perfect. But what should we expect? Certainly perfection is not attainable. The Fifth Annual Report gives an average of $I = 45.3$ for 22 companies. Since our calculated average for the 6th contract year is 17 points above the figure for the 5th contract year, improvement is indicated.

VII. FUTURE PLANS

The Knowledge Availability Systems Center of the University of Pittsburgh has operated a NASA Regional Dissemination Center since May of 1964. Throughout this period, the goals of this center have been service and self-sufficiency. A number of important events have occurred during the past year which will continue to contribute to the attainment of these goals. Included are:

- Acceptance, within the university environment, of the concept of a Campus-Based Information System.
- The decision to assign to KASC the operational responsibility for exploitation, on a fee basis, of the two Chemical Abstracts Service files, CONDENSATES and CHEMICAL TITLES.
- The addition of two experienced marketing personnel to the KASC staff.
- The initiation of the NASA RDC network to facilitate utilization of individual RDC files and areas of specialization.

Inherent within the goal of service is the utilization by KASC clients of new technologies described by the document files available to the KASC. This presupposes a continuous and growing clientele which will be a major concern of the KASC during the coming year. Extensive advertising and sales promotion measures will be undertaken to let prospective clients know who we are and what we can do for them. Existing clients often represent only one group in one division or location of a large company. The KASC message will be taken throughout these organizations through top level contacts, customer referrals, internal publicity channels, and group presentations.

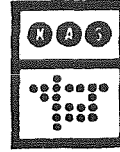
Utilization by our clientele of the KASC services is a second major concern for the coming year. With the advent of our capability to

search many files, both within our organizations and through the NASA RDC Network, we can provide supplementary information from many sources. Reacting to the changing needs and desires of the clients will require constant attention and immediate action. To these ends, several new systems are planned to handle inquiries, evaluation feedback from the client, document ordering, document evaluation, and clientele liaison.

Utilization by our clientele of the information and technology available to them through the services of the KASC is the third major concern for the coming year. Special attention to efficient searching, proper use of local supplementary information sources, and expanded use of resources outside the KASC will all contribute to providing pertinent information to clients. Additional personnel efforts will be required to help apply this information to the solution of problems, particularly for smaller companies.

APPENDIX A

Marketing Materials



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

January 1, 1969

Initial Letter L-1

Mr. John L. Roberts, President
J. L. Roberts Company, Inc.
101 Main Street
New York, New York

Dear Mr. Roberts:

The scientific and technological files of the National Aeronautics and Space Administration--comprising over 300,000 documents (indexed on computer tapes) and increasing at a rate of approximately 5,500 items per month--have been made available for use by private industry.

These files represent one of the major sources contributing to the tremendous amount of written material being generated every year. The quantity alone of scientific and technical data makes it physically impossible for individual scientists, engineers, managers, administrators, and supervisors to keep current in their respective fields. Thus, research is often duplicated, new technologies remain undiscovered and new techniques and disciplines remain hidden in a mass of untapped knowledge.

The NASA files, however, can be tapped.

This extensive data bank is a computerized reservoir of knowledge, from both national and international sources, which can be searched conveniently and expeditiously for current and retrospective literature. Exploitation of these files, through participation in the NASA/Industry/University of Pittsburgh Technology Transfer Program, can be achieved in various ways. For example:

Current Awareness Searches. The most recent literature--published and unpublished--can be searched on a monthly basis for items peculiar to your specific interest profiles.

Retrospective Searches. State-of-the-art surveys can probe the data bank to a depth of one, two, three, or four years. Or, a specific question--relating to some problem--can be searched for literature relating to that problem.

Exhibit 4-1

THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

Mr. Roberts
January 1, 1969
Page Two

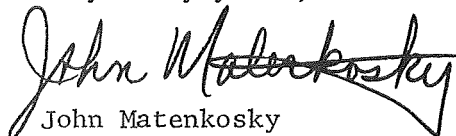
Your participation in this Program is encouraged because we are convinced that it will contribute to the prevention of wasteful duplication of your company's research efforts and funds, it will aid your personnel in keeping current in their respective fields, and it can make available to you new scientific and manufacturing techniques of potential value to your company and other business and industrial users.

The present list of participating members in the NASA/Industry/University of Pittsburgh Program numbers approximately 60. These firms range from small organizations employing as little as a dozen employees to such industrial giants as U. S. Steel, Pittsburgh Plate Glass and Westinghouse Electric Corporation. A list of these subscribers is submitted for your review.

The National Aeronautics and Space Administration has commissioned the University of Pittsburgh to acquaint industry--at no obligation--with this Program and to administer it in this area. As a member of the University staff, I have been assigned this responsibility.

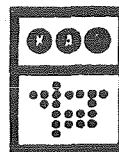
If you are interested in knowing more about our Program and how it can benefit your company, please contact me and I will be very pleased to discuss it with you in more detail.

Very truly yours,

A handwritten signature in dark ink, appearing to read "John Matenkosky". The signature is stylized with a large, sweeping "J" and a long, horizontal stroke extending to the right.

John Matenkosky
Marketing Representative

JEM/kmt
Enclosure (1)



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

February 1, 1969

Follow-Up I for L-1

Mr. John L. Roberts, President
J. L. Roberts Company, Inc.
101 Main Street
New York, New York

Dear Mr. Roberts:

Recently I wrote to acquaint you with the NASA Technology Transfer Program and to encourage you to exploit it to your advantage. Our services--individualized and completely confidential--provide retrospective searching of the entire unclassified NASA files and, on a monthly basis, a review of new literature entering the system to identify that which is appropriate to your current interests.

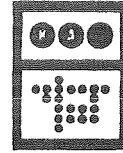
During the past year, we have been searching more than 1000 interest profiles per month for approximately 60 participating members who are putting to advantage the scientific and technological knowledge available to them in the NASA files. I have enclosed a partial list of typical interest areas into which these questions are categorized. Perhaps some of these reflect one or more of your own company interests.

I am convinced that participation in this NASA/Industry/University of Pittsburgh Technology Transfer Program can benefit your company. Our faculty and Center personnel have an almost day-to-day contact with new applications of science and technology. These personnel phrase your questions for computer search, evaluate output and insure submittal to you of only pertinent literature and, through verbal and written communication with you, can facilitate the identification of literature related to your company interests.

We, at the KAS Center of the University of Pittsburgh, are confident that we can be of help to you. Do contact me for any questions you may have about our service and how you can exploit the NASA files to the benefit of your company. I will be pleased to visit you to discuss the Program in more detail.

Yours truly,

John Matenkosky
Marketing Representative



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

March 1, 1969

Follow-Up Letter II for L-1

Mr. John L. Roberts, President
J. L. Roberts Company, Inc.
101 Main Street
New York, New York

Dear Mr. Roberts:

When the Congress of the United States created the National Aeronautics and Space Administration under the Space Act of 1958, it obligated the agency to "...provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

NASA concentrated its information transfer function in the Office of Technology Utilization, established in 1962. This Program has four basic purposes:

- To increase the return on public investment in aerospace research and development by encouraging application of findings outside of aerospace.
- To shorten the time lag between aerospace discoveries and their effective use elsewhere.
- To move new knowledge across disciplines, regions, industries and markets.
- To learn how best to transfer technology and to spread the use of transfer mechanisms that prove successful.

The NASA data bank comprises more than 300,000 documents (unclassified) which are abstracted, indexed, and filed on computer tape by accession number and index terms. The tapes are located in Regional Dissemination Center (RDC's) set up by NASA to serve the civilian sector of the economy. One of these RDC's is the University of Pittsburgh.

Exhibit 4-3

THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

Mr. Roberts
March 1, 1969
Page Two

I have already written to you about our Program and how it operates. I do hope this additional effort on my part will be accepted for what it truly is--a sincere desire to be of service.

We, at the KAS Center of the University, are so enthusiastic about our work in locating and disseminating scientific information and scientific intelligence that we sometimes overlook the fact that others are not as aware as we are of the benefits already derived by so many organizations who have participated in this experimental Program during the past five years.

I am enclosing for your review a few 'sample' abstracts of recent literature accessioned by NASA. These are typical of the more than 10,000 abstracts being sent out each month to the participants in our RDC activities (of course, each participant receives only those abstracts that are relevant to his interest profiles). After reviewing the abstracts, the participants will receive 'hard' copies of each document requested.

I am also sending you a listing of the scope of literature contained in our data bank.

I do hope this information helps to further your interest in the NASA/Pitt/Industry Technology Transfer Program. If you would care to discuss it further, I would be most happy to visit you--at no obligation--to present the Program in more detail.

Yours truly,

A handwritten signature in dark ink, appearing to read "John Matenkosky". The signature is fluid and cursive, with a long horizontal stroke at the end.

John Matenkosky
Marketing Representative

JEM/kmt
Enclosures (2)

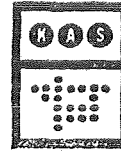
KASC MEMO

TO THE BOSS'S SECRETARY:

Screening the boss's mail is part of my job, too! That's why I inserted this little note--to call your attention to the importance of the attached letter.

It explains a service that could be very valuable to your company. Would you please route it to your boss's desk, or if it's "one of those days " around the office--please send it on to your Director of Research?

I would consider it a personal favor if you did--and I know it will make my boss happy, too!



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

January 1, 1970

Initial Letter for L-1

Mr. J. Stevnings, Manager
Clevite Corporation
109 South Lincoln Avenue
Bridgeport, Ohio 43912

Dear Mr. Stevnings:

Information is a resource parallel to land, labor, and capital. For people such as yourself who are concerned with return on investment, information is a common denominator. However, the mere existence of information is not enough--access to relevant information is the major factor which contributes to a successful return on investment.

Here at the University of Pittsburgh, access to information is one of our specialties. We apply this talent to the benefit of our many industrial clients by exploiting six computerized files (over one million entries) for information relevant to their scientific and technical interests.

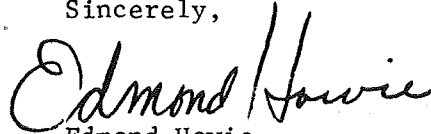
These files are:

- The National Aeronautics and Space Administration File. (Over 400,000 items and growing at a rate of approximately 5,500 per month.)
- The Chemical Abstracts Service Condensates File. (About 240,000 entries a year from over 12,000 journals.)
- The Chemical Abstracts Service Chemical Titles File. (Over 750,000 items and growing at a rate of 10,000 per month.)
- The Engineering Index Plastics File. (Over 14,000 items and growing at a rate of 600 per month.)
- The Engineering Index Electronics File. (Over 16,000 items and growing at a rate of 1,000 per month.)
- The Department of Defense Documentation Center Files. (Over 80,000 items and growing at a rate of 1,200 per month.)

Supplementing these files, we offer a spectrum of scientific and technical competence (16 subject specialists--nine of whom are members of the senior staff and faculty of the School of Engineering). This talent is applied to a company's needs on the basis of the technical disciplines associated with its interest areas. The specialists meet with your representatives, phrase profiles, prepare computer search strategies for your interest areas, and even screen search output--depending on your needs and wishes.

I am confident we can be of service to you. Why not contact me now for more information on how our talents and resources can be applied effectively and economically in improving your return on investment.

Sincerely,

A handwritten signature in cursive script that reads "Edmond Howie". The signature is written in dark ink and is positioned above the printed name and title.

Edmond Howie
Assistant Director

EH:cc



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

February 1, 1970

Follow-Up I for L-2

Mr. J. Stevnings, Manager
Clevite Corporation
109 South Lincoln Avenue
Bridgeport, Ohio 43912

Dear Mr. Stevnings:

Your company can have fast, low cost access to some of the worlds largest technical data files. Access is available through the Knowledge Availability Systems Center of the University of Pittsburgh. Whether your organization is large or small, KASC is uniquely qualified to serve your technical needs.

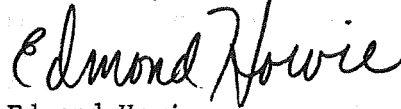
- KASC has six computerized data files containing scientific and technological information collected worldwide; over one million entries with more than 38,000 additions per month.
- KASC is one of six Regional Information Dissemination Centers for the National Aeronautics and Space Administration. The technology that sent man to the moon is documented. Part of KASC's job is to assist organizations such as yours to find application for this information.
- KASC interacts with another University organization, the Pittsburgh Chemical Information Center, to provide an information program that will serve the chemical industry.
- KASC provides fast, confidential service. Our services are sold on a not for profit basis. Annual search results are provided at a cost of \$50.00 and up.

THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

- KASC is supported by sixteen technical specialists, nine of whom are members of the senior staff and faculty of the School of Engineering. The expertise of this group is applied to the needs of our clients; to help define the clients area of interest and then to translate client questions to computer search format. In an informal way, they can guide a client in his direction of research effort or pass along information from the specialists personal knowledge.

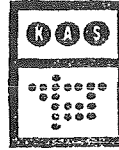
Here at KASC we consider information to be a resource, in the sense that land, labor and capital are resources. That's why we've written you this second letter. We'd like to tell you how our information resources can benefit you. Please call or write.

Yours very truly,



Edmond Howie
Assistant Director

EH:cec



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

March 1, 1970

Follow-Up II for L-2

Mr. J. Stevnings, Manager
Clevite Corporation
109 South Lincoln Avenue
Bridgeport, Ohio 43912

Dear Mr. Stevnings:

Our service can benefit your company! That's why we have written to you on several occasions. We want to explain a technical information program that is helping companies such as yours to develop that all important "competitive edge."

What is your field of interest? If you need information on inventions, concepts, designs, discoveries, techniques, computer software or managerial methods; we have it. It's in our computerized files. We can search the files for information relevant to your field of interest.

We're a Regional Dissemination Center for NASA; we are a node in a national information network; we provide Chemical Information Services; we sell computer programs and much much more.

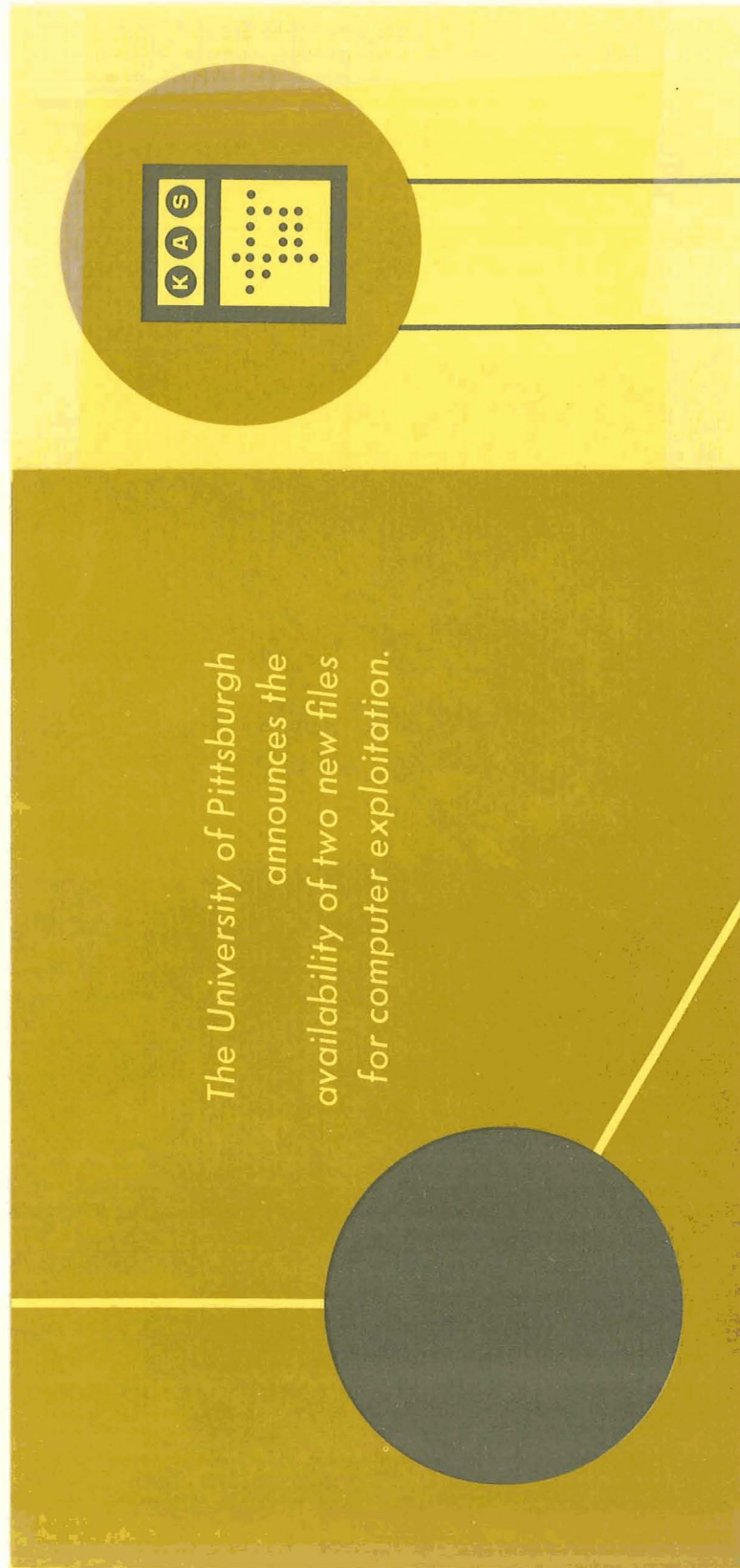
May we hear from you today?

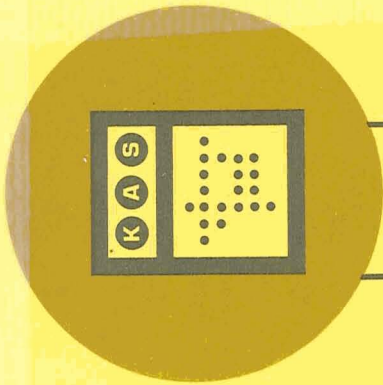
Yours very truly,

A handwritten signature in cursive script that reads 'Edmond Howie'.

Edmond Howie
Assistant Director

EH:cec

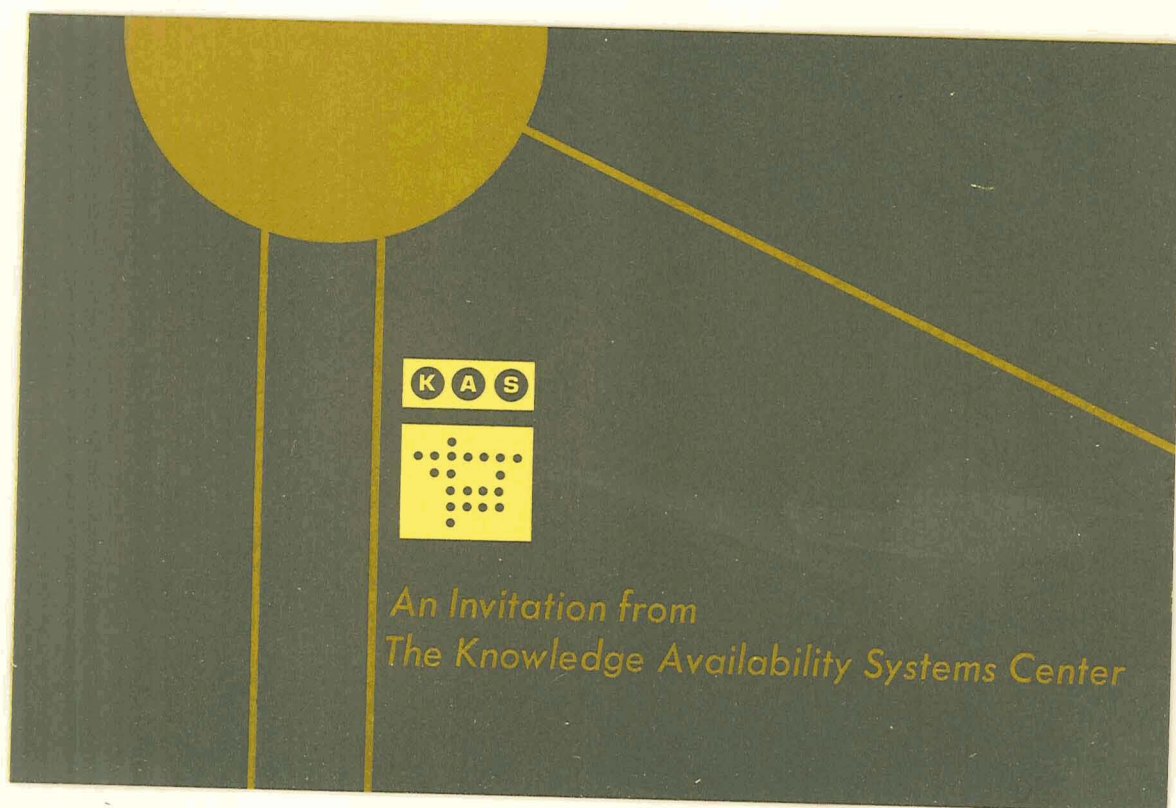


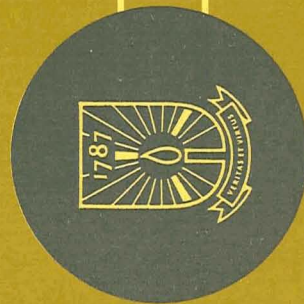


THE CAS CONDENSATES FILE
THE CAS CHEMICAL TITLES FILE

PRACTICAL
INEXPENSIVE
CONVENIENT
VALUABLE







*The University of Pittsburgh KAS Center
invites you to exploit any of its computerized files
for information relevant
to your fields of interest.*

Exhibit 4-9

I am interested in the KASC
Information Service(s) indicated:

- ☐ Chemical Condensates
- ☐ Chemical Titles
- ☐ NASA/Pitt/Industry Technology
Utilization Program
- ☐ Engineering Index
- ☐ Defense Documentation Center

Please contact me to arrange

- ☐ Personal presentation
- ☐ Group presentation
- ☐ Further discussion

Name _____

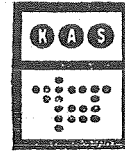
Organization _____

Street Address _____

City _____

State _____

Zip Code _____



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

February 1, 1970

Single Letter L-3

Mr. Ronald W. Dunne, President
Dunne Rubber & Plastic Company
Post Office Box 607
Ashtabula, Ohio 44004

Dear Mr. Dunne:

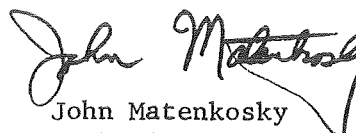
If you could substantially increase your Research and Development activities, the impact on your company might include new products to market, improved product quality, lower costs, and greater production. Since doubling the budget may be out of the question, consider this: you can effectively increase the size of that budget by taking advantage of the research expenditures of other organizations.

The results of work done worldwide by thousands of scientists and engineers are reported in the published and unpublished technical literature—domestic and foreign journals, books, conference proceedings, and government reports. The information you need may very well exist but be unavailable to you because a complete manual review has become practically impossible.

To provide rapid access to valuable technical information, nearly 30,000 important documents are now analyzed, abstracted, microfilmed, and indexed each month through the efforts of four organizations—the National Aeronautics and Space Administration (NASA), the Chemical Abstracts Service of the American Chemical Society, the Department of Defense, and the Engineering Index Service. They produce at their own expense the computer tapes containing the keys to this vast storehouse of information. The doors can be opened for you by the Knowledge Availability Systems Center.

Each month, you can have the results of these efforts tailored to your interest and delivered to your desk for less than you pay your chief engineer for one hour's work. For a description of the KASC Information Services, please read the brochure enclosed and then call us to make an appointment for a more detailed discussion.

Sincerely,


John Matenkosky
Marketing

KASCABILITY?

KASCABILITY is the capability of KASC to provide you with technical information which is relevant to your interests!

KASC is the Knowledge Availability Systems Center of the University of Pittsburgh.

KASCABILITY provides you with access to a data bank that contains more than one million citations from these files:

- NASA - National Aeronautics and Space Administration
- CHEMICAL TITLES - CA CONDENSATES Chemical Abstracts Service
- DDC - Department of Defense Documentation Center
- ENGINEERING INDEX - Plastics; Electrical/Electronics

KASCABILITY includes knowing something about YOU.

You need information!

You need information fast!

You need information to solve problems!

You need information to plan new products!

You need information to keep you up to date!

You need information that isn't always easy to find!

KASCABILITY provides a full range of services to save you time and energy!

Workshops

Abstracts

Custom Profiles

Documents

Retrospective Searches

Microfiche

Current Awareness Searches

Bibliographic Citations

Standard Interest Profiles

Consultation with Pitt School of Engineering

Service rates start at \$50. Service is confidential!

If you use technical information in your business, chances are that KASCABILITY can benefit you. To find out for certain, take 60 seconds to fill out the attached card.

I am interested in the KASC
Information Service(s) indicated:

Please contact me. I want:

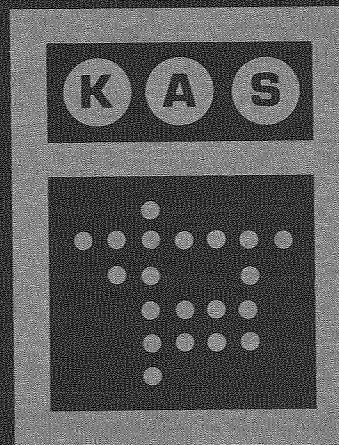
- ☐ Chemical Condensates
- ☐ Chemical Titles
- ☐ NASA/Pitt/Industry Technology
Utilization Program
- ☐ Engineering Index
- ☐ Defense Documentation Center

- ☐ Additional information
- ☐ A personal presentation
- ☐ A workshop to phrase profiles for
users within my organization
- ☐ A workshop at KASC

Name _____ Organization _____

Street Address _____

City _____ State _____ Zip Code _____



KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH, PITTSBURGH, PENNSYLVANIA 15213

INFORMATION SERVICES OF THE KAS CENTER

A NASA REGIONAL DISSEMINATION CENTER



NASA REGIONAL DISSEMINATION ACTIVITY OF KASC

Administration Edmond Howie

Information Analysis .. Elizabeth P. Hartner

Technical Operations..... Guy W. McGee

Marketing Frank L. O'Donnell

Engineering Operations .. Walter R. Turkes*

KNOWLEDGE AVAILABILITY SYSTEMS CENTER

Director Allen Kent

Associate Director..... Jack Belzer

Assistant Director Eleanor D. Dym

Assistant Director Edmond Howie

*The University of Pittsburgh School of Engineering participates actively and formally in the NASA RDC activity. Walter Turkes, Associate Dean of the School of Engineering, is Chairman of an Engineering Faculty Consultant Group spanning a broad technology spectrum which is applied directly to the needs of KASC clients.

Technology Never Stands Still—

Are You Being Left Behind?

THIS brochure will introduce to you a unique service designed to keep you abreast of scientific and technological developments relevant to your areas of interest. The service is designed for use by the technician as well as the development and production engineer; the administrator, as well as the manager.

In this age of scientific breakthroughs, new technology is being developed almost faster than it can be documented. But documented it is, and the service described in these pages is intended to make available to you both the scientific breakthroughs and the new technologies as fast as they become documented in order that you may utilize them to your own benefit.

The Knowledge Availability Systems Center (KASC) provides its services utilizing the document collections of various organizations. Currently, our major source of information comprises two of the largest national and international files known to us: the extensive and well-known files of the National Aeronautics and Space Administration, and the popular files of the Chemical Abstracts Service (CAS) Division of the American Chemical Society—Condensates and Chemical Titles.

The NASA file has been completely operational for more than five years. The CAS file is presently being exploited on an experimental basis—for both industrial and nonindustrial participants—but is expected to be operational very soon. From time to time, other services and literature collections will be introduced and, in the near future, we hope to have at the University of Pittsburgh a Campus-Wide Information System serving both the academic and nonacademic communities of the region.

The rapid advances in worldwide technology and the resultant increase in output of technical literature has given considerable impetus for the establishment of a mechanized dissemination service such as that provided by KASC.

The KASC system is designed to identify, evaluate and disseminate information which will make available to you new and useful data relevant to your present areas. It can help you increase productivity, develop new products, modify existing products, and discontinue marginal or unprofitable items.

We urge you to become a participant in the KASC Programs.

The Information Treadmill

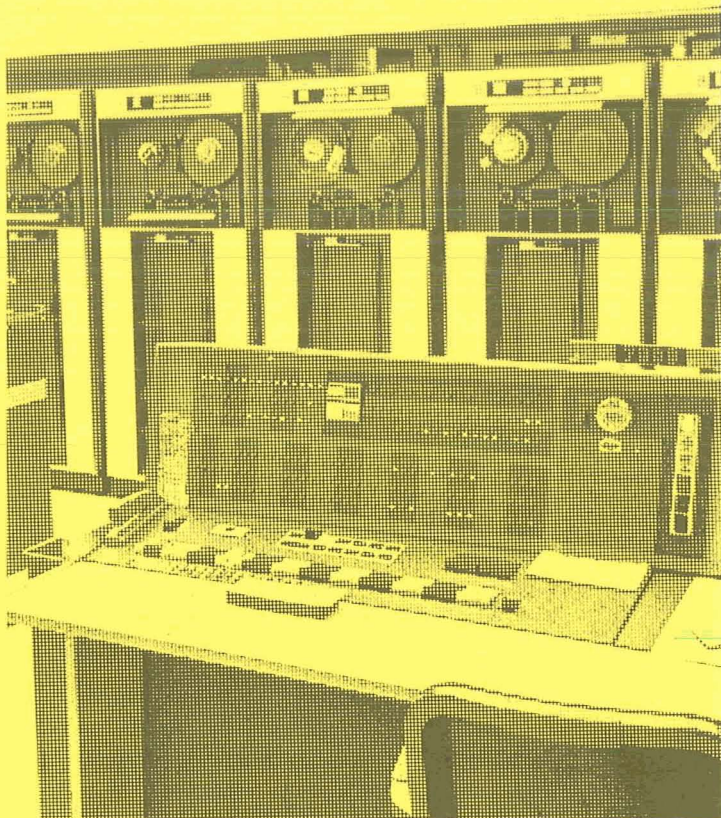
WHY reinvent the wheel? . . . or a technique? . . . or a system? Why spend endless man-hours in futile literature searches? Why try to subscribe to all the periodicals in your technical interest area, and then have to scan laboriously through them, and, finally, to store them for future reference?

KASC CAN HELP YOU IN SO MANY WAYS...

Here are just a few of the many services KASC stands ready to offer you to improve your profit picture:

- To find out what others are doing in the field in which you are working.
- To assist in a search for an advanced new material having the desired characteristics for a special application.
- To locate improved methods for lowering your manufacturing costs.
- To determine if designs and devices being used for other purposes are adaptable to your needs.
- To be brought up-to-date in the advanced technology of an unfamiliar field.
- To determine new uses for your present plant facilities.
- To be kept up-to-date about new management techniques which can be adapted to your organization.
- To obtain quickly a broad understanding of an area in which you are working.
- To extend the range of literature searches which your own company library is performing for you.
- To keep up-to-date on the latest developments being added to the KASC technology bank in your area of interest.
- For new ideas and applications in extending the market for your present product line.
- For background information when preparing a proposal.





KASC IN ACTION

Senior members of the Engineering Faculty and Staff of the University of Pittsburgh can help you:

- Define your research and technological problems and objectives in relation to your information needs.
- Couple new techniques or systems to applications in your field of interest.
- Phrase your interest profile for translation by KASC specialists into a computer search strategy.

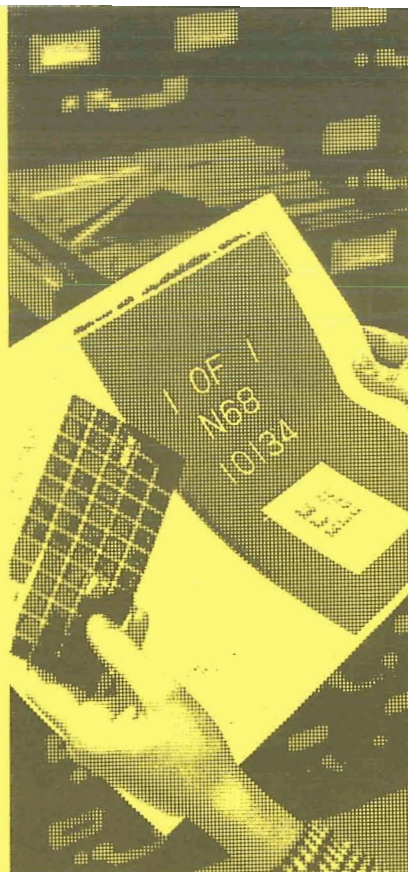
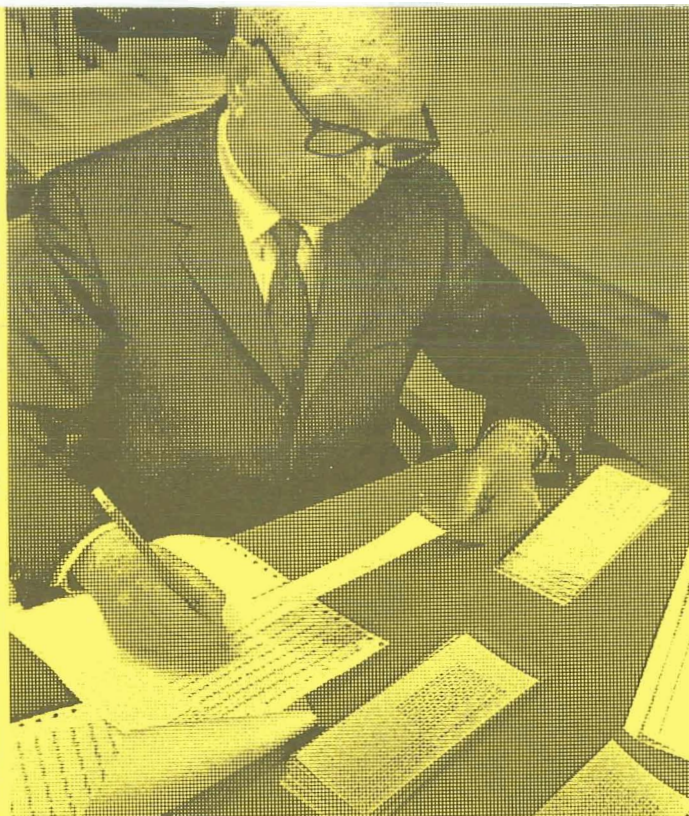
USING A COMPUTER, KASC CAN PERFORM...

Retrospective literature searches of the NASA file comprising over 400,000 items and growing at a rate of approximately 70,000 new items annually.

Current awareness searches of the same file on a monthly basis. As each new tape is received from NASA, its contents (between 5500 and 6000 items monthly) are searched for the most recent literature in the file related to your areas of interest.

WITH ITS RESOURCES, KASC CAN IDENTIFY...

- Research in progress of interest to you.
- Scientists and other personnel working in your interest areas.
- Organizations engaged in the same and related interest areas.
- Other sources of information.



University of Pittsburgh Engineering faculty assigned to KASC meet with company representatives, such as:

- Basic research scientists
- Applied research scientists
- Management system specialists
- Technical information specialists

Together they develop a concise, confidential description of the company's needs which KASC can help meet.

The needs may be positive, or negative, or both: How can we perform X? Why can't we perform X? What are the known results? What results are not known?

What way is most efficient? Least efficient? Most economical? Least economical?

Who is performing work on X? Who is not performing work on X?

What work has been performed? What work has not been performed?

What new technique, product, or system can be used? Cannot be used?

What approach has proven valid? Proven invalid?

What conditions affect X? Do not affect X?

Each need so identified is developed into a customized interest profile, and a computer search is performed of the file comprising published and unpublished technical articles and reports from all over the world.

Depending upon the need, the entire file can be searched, or only a portion if necessary.

A single search can be performed, or additional searches performed each time new items are added to the file.



Sources of Information

THE KASC information bank is collected, abstracted, and indexed by the National Aeronautics and Space Administration for its own programs. An index in depth is made available on computer tape, and is periodically updated with the latest additional items.

Approximately two-thirds of the unpublished or report literature for this collection comes from Federal agencies and institutions of higher education as a result of research which you have helped support through your tax dollars. The remaining one-third comes from foreign governmental agencies and educational institutions.

Approximately sixty percent of the published literature in the collection comes from United States periodicals and from proceedings of professional societies, while the remainder comes from such countries as the USSR, Britain, France, Germany, Japan, Italy, Poland, the Netherlands, Czechoslovakia, etc.

The results of these searches can be sent to you . . .

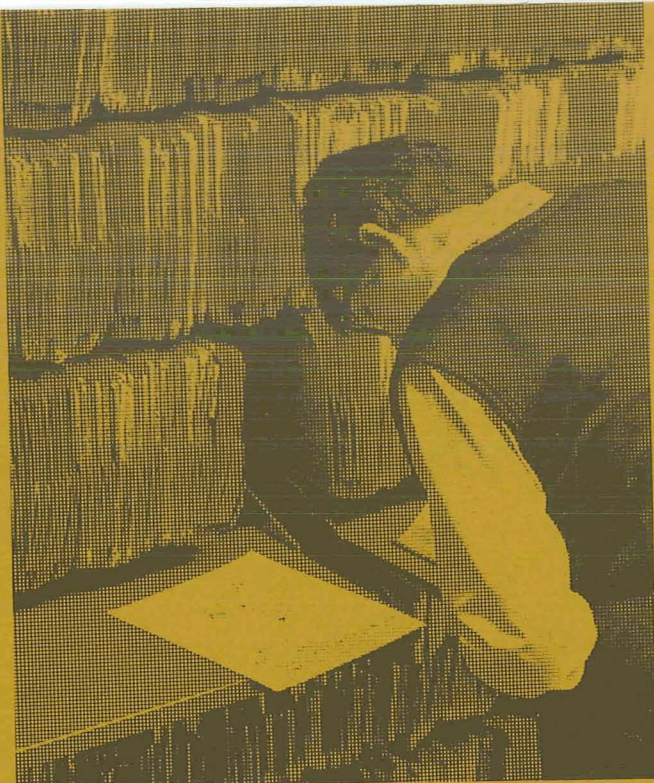
Identifying the articles, books and reports relevant to your customized profile,

Identifying the above items and providing abstracts of each, or

Identifying only those items and providing abstracts which the responsible Pitt faculty member or specialist knows to be of direct application to the problem or need for which the customized interest profile was developed.

For any type of search result, a KASC representative is as near as your telephone to discuss the search results and to alter the profile for future searches.

In addition, a full document copy of most of the abstracts referred to you can be obtained through KASC.



Services

Type I

Current Awareness

Retrospective

Current Awareness and Retrospective

Subscriber to this service will receive only a computer print-out which lists the accession numbers of cited documents. No engineering review or abstracts will be furnished.

Type II

Current Awareness

Retrospective

Current Awareness and Retrospective

Subscriber to this service will receive abstracts of all documents cited by the computer search. No engineering service will be provided.

Type III

Current Awareness

Retrospective

Current Awareness and Retrospective

Subscriber to this service will receive engineering review plus relevant abstracts.

Type IV

Standard Interest Profile

Subscriber to this service will receive abstracts of cited documents which reflect interests of users in general in a subject area.



Things to Come

A network system is in the planning stage. This system, which is expected to be implemented very shortly, will connect KASC with the other five Regional Dissemination Centers throughout the United States. In this manner, each of the RDC's will have access to each other's specialized files and be able to extend the number of data bases available for exploitation by interested participants.

The Knowledge Availability Systems Center will, from time to time, add other services and literature collections to supplement the current utilization of the technical and nontechnical domestic and international document collection of the National Aeronautics and Space Administration and Chemical Abstract Services.

Also, KASC is currently experimenting with exploitation of existing files such as:

Chemical Titles

Chemical Abstracts

ASCA (Automatic Subject Citation Alert)

Our long-range objective is a University of Pittsburgh computer-based information system exploiting local and national resources effectively, efficiently and economically to further the interests of both our academic and nonacademic participants.

Research Information— A Real Bargain

THE National Aeronautics and Space Administration collects, organizes, abstracts, and indexes its extensive files in connection with its program to provide the widest practicable and appropriate dissemination of information concerning its activities and results achieved. The cost of implementing such a program is probably beyond the capabilities of most industrial companies and organizations in the United States.

Yet, because of the NASA effort, it is possible for you to monitor, in relation to your needs and at a very low cost, a significant portion of the research and technological results achieved by our Federal Government, by foreign governments, and by domestic and foreign educational institutions. Of particular importance, scientific and technical literature you can monitor deals significantly with new innovations in processes, products, procedures, materials and systems. The cost to you is based entirely upon the operational cost of the service program described above.

For further information about this Program, and without any obligation on your part, complete, and mail the enclosed self-addressed postcard.

We will be happy to be of service to you.

Glossary of Terms

Current Awareness Search—a search of the most recent monthly tape received from NASA containing that month's acquisitions—approximately 5500 new items per month.

Retrospective Search—a complete search of the entire NASA file which comprises about 400,000 items.

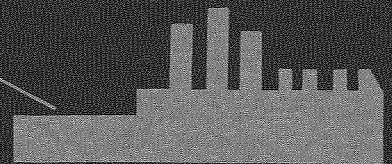
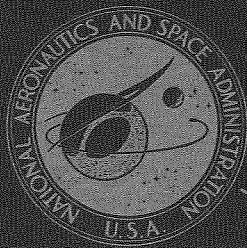
Engineering Review—a technical review of the abstracts of computer-cited documents for their relevancy to the customer's profile.

Relevant Abstracts—only those abstracts deemed pertinent to the Interest Profile by the engineering consultant and/or analyst.

Interest Profile—a term describing the documented interests of an engineer or scientist of a company.

Standard Interest Profile (SIP)—a profile covering similar information interests designed to meet the needs of many users at a substantial cost reduction. Subscriber will receive abstracts pertinent to the SIP.





LETTER OF INTENT

(Date)

This is a Letter of Intent on the part of _____
to become a participant in the Knowledge Availability Systems
Center (KASC) program of the University of Pittsburgh, Pittsburgh,
Pennsylvania.

This Letter is to serve as a basis for establishing a formal
relationship between _____
and the University of Pittsburgh so that the University may
initiate the necessary action for a meeting between our respective
representatives to discuss our areas of interest and to determine
the number of Interest Profiles to be included in the formal
agreement.

The University (KASC) agrees to honor a commitment to service
the number of questions to which _____
subscribes.

Name

Title



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3300

February 3, 1970

Renewal Cover Letter

Mr. John Parrish
Senior Engineer
Leece-Neville Company
1374 East 51st Street
Cleveland, Ohio 44103

Dear Mr. Parrish:

During the past year, important scientific and technical information-- concepts and designs, discoveries and inventions, materials, techniques, processes, and data--has been made available to you through the KASC/NASA Technology Utilization Program. However, the search which will be performed in mid-May is the last one authorized by our present agreement. If you anticipate any delay in the approval of a new purchase order, please complete and return the enclosed Letter of Intent in order to ensure continuity of service.

This would be an excellent time to review the relationship of the existing search questions to cover new areas of interest. As a result of our continuing efforts to establish KASC as your major source of scientific information, we can now provide you with access to the five major computer-searchable files: the Department of Defense Documentation Center, the Engineering Index, the Chemical Abstracts Condensates, the CAS Chemical Titles, and, of course, the NASA file which now contains well over 500,000 items. Computer programs from the COSMIC organization are also available.

We want you to call on KASC for computerized access to any technical information which can help your people to achieve their goals. Please let us know how we can be of further service to you.

Sincerely,

John Matenkosky
Marketing Representative

JEM:mnd
Enclosures

Continued from page 67

Close tolerance temperature-humidity chambers are available in a two-stage mechanical refrigeration system, with a low temperature capability of -100° or single stage at -65° F. The new series, HH-5100, from Associated Testing Labs, reportedly will provide closer temperature and humidity measurement at prices slightly more than the conventional unit. Circle 157

Nondestructive weld tester, a solid state analog computer, permits in-process checking of resistance welds on production line. The Digimetrics Weldicator from Falstrom Co. eliminates need for destructive pull tests and photomicrographs. The tester connects directly to welding machine electrodes, electronically evaluates the weld and indicates results on read-out dial. Priced under \$1,000. Circle 158

Free-flowing ultraviolet light absorber will not lump or cake under severe storage conditions. Carlisle's Carstab 705, a substituted benzophenone, provides maximum UV protection in polypropylene, polyethylene, EVA, polycarbonate, PVC, acetal, cellulosic and epoxies. Characteristics are excellent heat stability, low volatility and high resistance to extraction. Data sheet available. Circle 159

Information retrieval service

Here is a unique new way to obtain greater detail and more depth of information on some of the materials and processes that are described in this magazine. In cooperation with the Knowledge Availability Systems Center operating at the University of Pittsburgh under contract with NASA, we have prepared a series of abstract packages covering a wide range of reports on engineering materials and processes.

Each abstract package below is available for \$3.00. Simply circle the appropriate number on a Reader Service Card in back of this issue and send the card and payment to us. After reading the abstracts you may get copies of the original reports from the source or from your library. However, as a fast, convenient back-up service we'll supply reports through KASC at a nominal rate. **PAYMENT MUST ACCOMPANY ORDER.**

Sandwich materials and structures. Fourteen abstracts of recent reports covering: new materials, high temperature structures, honeycomb-based sandwich structures, adhesive bonding, design properties and non-destructive testing. \$3. Circle 361

Carbon and Graphite. Nothing but very recent reports are covered in these 21 abstracts describing: carbon and graphite reinforced composites, pyrolytic carbon, refractory compounds, high temperature properties, nuclear and aerospace uses. \$3.00. Circle 362

Columbium and its alloys. Abstract of 18 reports covering wide range of columbium technology, including: high temperature, creep and creep-rupture properties, processing characteristics, diffusion bonding, protective coatings and present and potential applications. \$3.00. Circle 363

Metals for low temperature (cryogenic) service. Eighteen abstracts of reports on suitability of metals for cryogenic service cover: electro-formed Ni and Ni-base alloys, Mg, high strength aluminum Stainless steels and composites. \$3.00. Circle 364

Honeycomb materials and structures. These 27 abstracts of late reports cover methods of fabrication, nondestructive testing, as well as current structural and energy-absorbing applications for a wide range of metals, plastic and paper. \$3.00. Circle 365

Titanium and its alloys. Crack tolerance, high temperature properties, ductility and toughness information are abstracted from 18 reports. \$3.00. Circle 366

Adhesive bonding. Abstracts of 14 U. S. reports cover high temperature bonding, bonding stainless steels, plastics, composites and sandwich structures, new adhesives and effects of processing conditions on bonding. \$3.00. Circle 367

Aluminum Oxide. Nineteen abstracts describe thermal and heat resistance properties, coatings, parts, bearings, and processing. \$3.00. Circle 368

Effect of space environment on materials. Emphasis in these 24 abstracts is on characteristics and effects of environment on thermal control and high emittance coatings. Other materials and structures are covered. \$3.00. Circle 369

Nondestructive testing methods. Thirty-eight abstracts of reports cover microwave NDT, sonic testing, radiographic inspection, holographic interferometry, thermal image inspection, NDT of reinforced plastic parts, weld testing, and liquid penetrant and magnetic article testing. \$3.00. Circle 370

Tungsten parts, coatings and fibers. Latest developments are summarized in 25 abstracts of reports. Emphasized are production of free-standing tungsten parts, wear and heat resistant coatings and use of tungsten fibers to strengthen other metals. \$3.00. Circle 371

Laser welding. Key literature on new joining method is summarized in 22 abstracts covering: joining wire and foil, drilling small holes, microwelding, electronic packaging, microcircuit interconnection and medical uses. \$3.00. Circle 372

Adhesives. Confined mostly to high and low temperature aerospace uses, abstracts summarize 20 reports on: effects of radiation, vacuum and temperature on adhesives, bonding GRP to metal, bonding sandwich structures, surface preparation, etc. \$3.00. Circle 373

Metal reinforced composites. This collection of 29 abstracts summarizes latest reports on an important new class of materials—metal reinforced composites. \$3.00. Circle 374

Metals and alloys for high temperature service. The high temperature behavior of a wide range of steels, superalloys, refractory metals, magnetic alloys and selected nonferrous metals is set forth in these 33 abstracts of industry and government reports. \$3.00. Circle 375

Protective coatings for refractory metals. Large amounts of time and money have been spent on developing protective systems for Ta, V, Mo, W, Nb and Cr against high temperature oxidation. These 48 abstracts describe state-of-the-art reports. Circle 376

New developments in metals forming. Abstracts of 45 late (1965+) reports summarize new developments. Continued on page 71

APPENDIX B

Technology Transfer Cases

TECHNOLOGY TRANSFER CASES

Transfer One

Document N67-25359 -- Dispersions in Solids. The Kawecki-Berylco Industries, Incorporated has developed a strong, light-weight alloy by the use of a colloid chemical method of effecting oxide particle dispersion hardening as discussed in this document. The material developed, a dispersion hardened beryllium alloy, is used for an essential component in inertial guidance systems, now used not only in space navigation but for transoceanic navigation of commercial passenger and freight jet planes.

Transfer Two

Document N68-33242 -- An Investigation into the Relationship between Precracked Charpy W/A and Plane Strain Fracture Toughness for High Strength Steels. The correlation reported in this document between the easily measured W/A values for fracture toughness, and the values $K_{Sub IC}$ needed for specification control, enabled the engineer to make a rapid determination of approximate $K_{Sub IC}$ values from the W/A values, thus saving considerable time and money to eliminate material which obviously would not pass specification requirements.

Transfer Three

Document N68-37823 -- Interaction of Liquid Sodium with 304 Stainless Steel. The document was reported by the user as a source of background knowledge. There was no direct transfer but the docu-

Transfer Three (Continued)

ments were of value in making judgments when selecting materials to contact liquid sodium. Estimated yearly savings reported of \$300.

Transfer Four

Document N68-38344 -- Microprobe Determination of the $\alpha/(\alpha+\beta)$ Boundary for the Zr-Nb system. The document outlines structural changes in an alloy as a result of changes in temperature and composition ranges. The new procedures save time and effort to the amount of a yearly savings of \$500.

Transfer Five

Document N68-34563 -- Preliminary Evaluation of Greases to 600°F and Solid Lubricants to 1500°F in Ball-Bearings. The client reported that the information in relation to high temperature lubrication of ball bearings improved the quality of the product. Specific data contained in the document were of use.

Transfer Six

Document N68-34738 -- A Five-Ball Friction Machine for Study of Lubricating Materials. The client reporting the value of this document is the same as the client reporting N68-34563. The use is again for the study of high temperature lubrication, and the selection of such lubricants.

Transfer Seven

Document N68-32344 -- The Attack of Steel by Hydrogen at High

Transfer Seven (Continued)

Temperature and High Pressure. The document gives data, for steels of specific composition, in regard to hydrogen attack at high temperature and high pressure. The information was used in the design of steel pressure vessels for hydrogen.

Transfer Eight

Document N68-38405 -- The Effect of Heat Flux on the Atmospheric Turbulence Spectra Over Land. The document describes a sensitive cup anemometer for wind profiles. The instrument will be adapted as an aid in the design of buildings, bridges, etc. for which the amount of wind load must be known.

Transfer Nine

Document N68-38430 -- The Behavior at Subsonic Speeds of a Mirage III O Pitot-Static Probe Mounted Close To a Hyperbolic Headed Gust Probe. The document describes a gust measuring probe. The instrument also will be adapted to aid in the design of buildings, bridges, etc. for which the amount of wind load must be known.

Transfer Ten

Document N68-20950 -- Ultrasonic Method for Nondestructively Detecting Radiation Induced Embrittlement in Pressure Vessel Steels. The document is one of many reported by the client as of value in reducing time and money expended to identify methods for nondestructive testing. This client company and another client company both report our service the most valuable for non-destructive testing methods, where new materials and uses for materials

Transfer Ten (Continued)

are encountered.

Transfer Eleven

Document N68-19623 -- Optimization and Evaluation of Electrophoretic Protective Coatings for Tantalum T-222 Alloy. The document supplied information was used to set up experiments for developing electrophoretic coatings for another alloy. Proposed experimentation was no longer necessary. Information in the document was beneficial to productivity and product quality.

Transfer Twelve

Document N68-26125 -- Experimental Investigations of the Behavior of Brittle Materials at Various Ranges of Temperature. This document contains high temperature property data of ceramic materials, used by the client to direct the selection of materials.

Transfer Thirteen

Document N65-19497 -- Instrumentation Grounding and Noise Minimization Handbook.

Document N66-14925 -- Interference Reduction Guide for Design Engineers - Vol. 1.

Document N66-14226 -- Interference Reduction Guide for Design Engineers - Vol. 2.

The 3 documents listed above are from a bibliography of many such documents identified through our service by the client interested in reduction of electrical noise interference with control instru-

Transfer Thirteen (Continued)

ments used in plants and laboratories. From the information found from all these sources, the client will write a Guide Handbook for plant engineers. We expect to obtain one of these Handbooks as evidence of technology transfer when it is completed.